

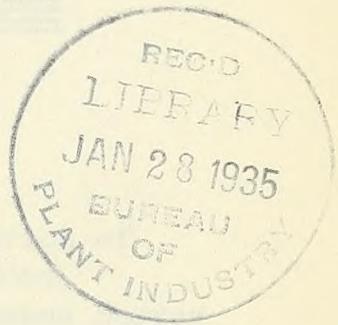
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THE PLANT DISEASE REPORTER

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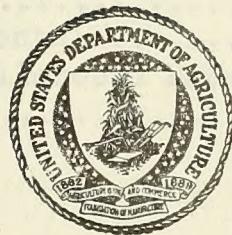
Division of Mycology and Disease Survey



Supplement 86

Diseases of Plants in the United States in 1933

January 15, 1935



BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

DISEASES OF PLANTS IN THE UNITED STATES IN 1933

Compiled by

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Plant Disease Reporter
Supplement 86

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INTRODUCTION

The practical worth of any summary of the reported incidence and economic importance of the plant diseases of any State or aggregate of States is obviously dependent upon the extent and accuracy of the reportorial service contributed to the task of getting out such a summary. In general, the volume and amount of detail submitted by the several collaborators on the occurrence and severity of plant diseases in the United States, in 1933, were very satisfactory. Occasionally, however, such meager and generalized reports as "same as last year;" "Reported but not observed;" and "Considerable infection" were received. Obviously, such records are of little value to the reader in quest of specific information.

The very general curtailment of allotments for travel has, of course, made it difficult, sometimes impossible, in recent years, to obtain information on the prevalence and severity of plant diseases. Hence, even at best, a summary such as the following can not be other than somewhat disappointing to the reader who desires and expects full reports on the incidence and severity of the diseases of any given crop or group of crops.

The weather over the United States as a whole, during the past year, was hot and dry in comparison with that of a normal year; hence, from the standpoint of plant diseases in general, 1933 was not remarkable. Such exceptional instances of disease outbreak as occurred will be adequately treated in those parts of the text devoted to the diseases of the crop or crops in question.

Among the more noteworthy plant-disease occurrences of the year were the discovery of the extensive infection of the Dutch elm disease in New Jersey and New York (this summary, p. 70), the continued increase in distribution and severity of the bacterial wilt of corn (this summary, pp. 24-25), the discovery of the root rot fungus, Phymatotrichum omnivorum, in Washington County, southern Utah, where it has not previously been known to occur but where it is evidently indigenous (P. D. R. 17:36 and 53), the widespread disappearance of the eel-grass, Zostera marina, from the Atlantic Coast (this summary, p. 92), and the sudden appearance of a leaf variegation of unknown cause on the Blakemore strawberry in several States (this summary, p. 39.).

The summary includes only reports made to the Survey. No reference to important contributions to the literature of phytopathology during the year has been attempted. A list of the known host plants of the root-knot nematode, Heterodera marioni (H. radicicola), compiled by Edna M. Buhler, Corrine Cooper, and G. Steincr of the Division of Nematology is given in the Reporter (P. D. R. 17:64-96.)

TEMPERATURE

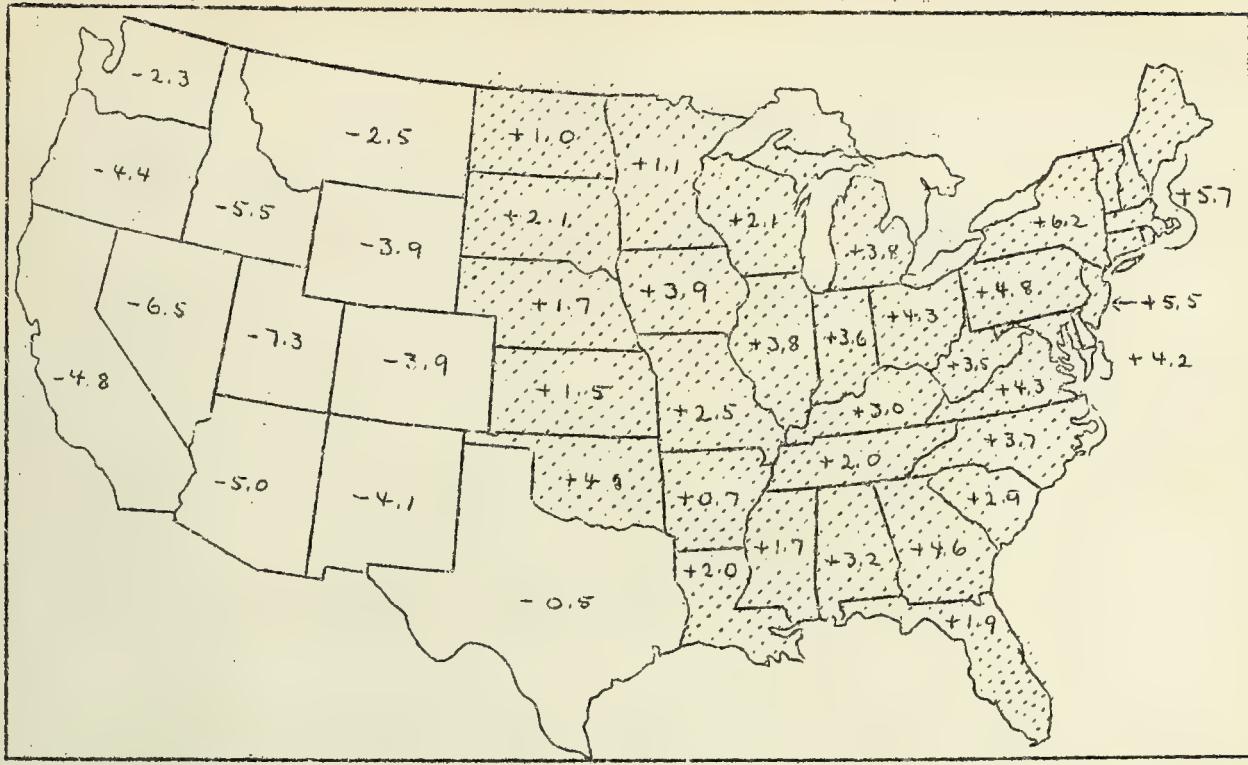


Fig. 1. Departure from the normal temperature for the winter, December, 1932 to February, 1933, inclusive. Shaded: Normal or above.

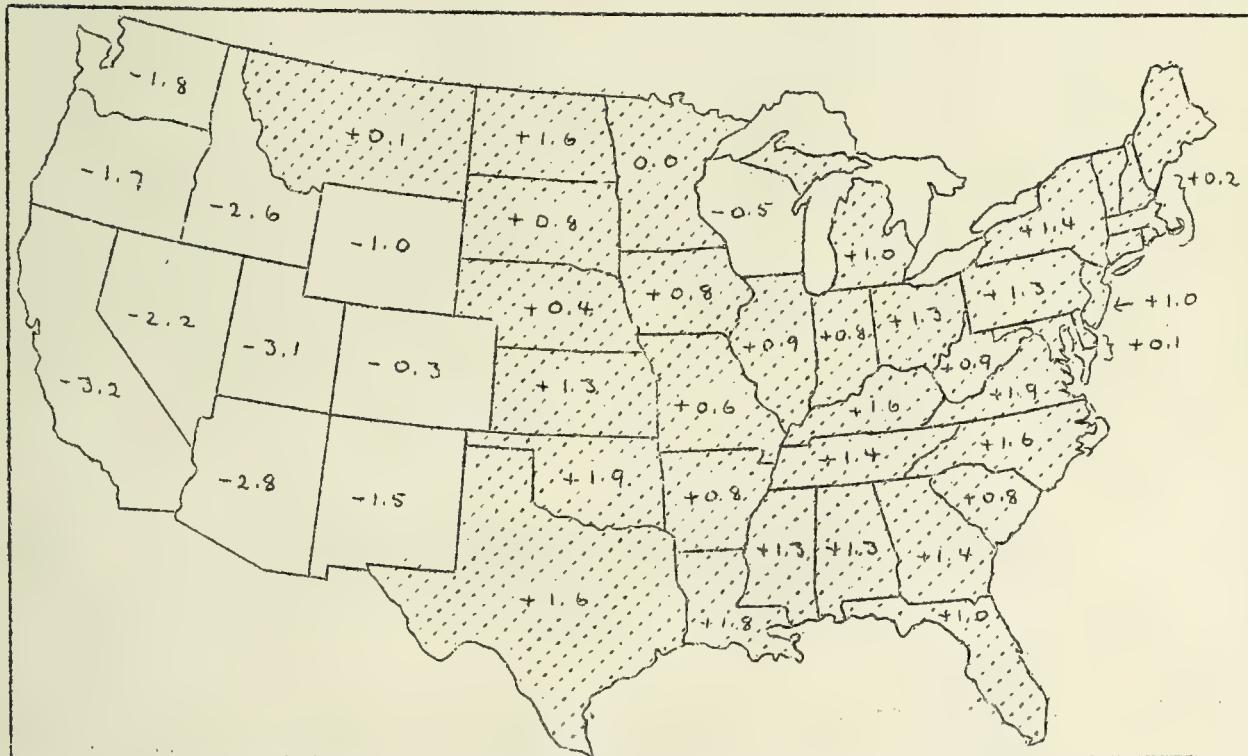


Fig. 2. Departure from the normal temperature for the spring, 1933, March to May, inclusive. Shaded: Normal or above.

TEMPERATURE

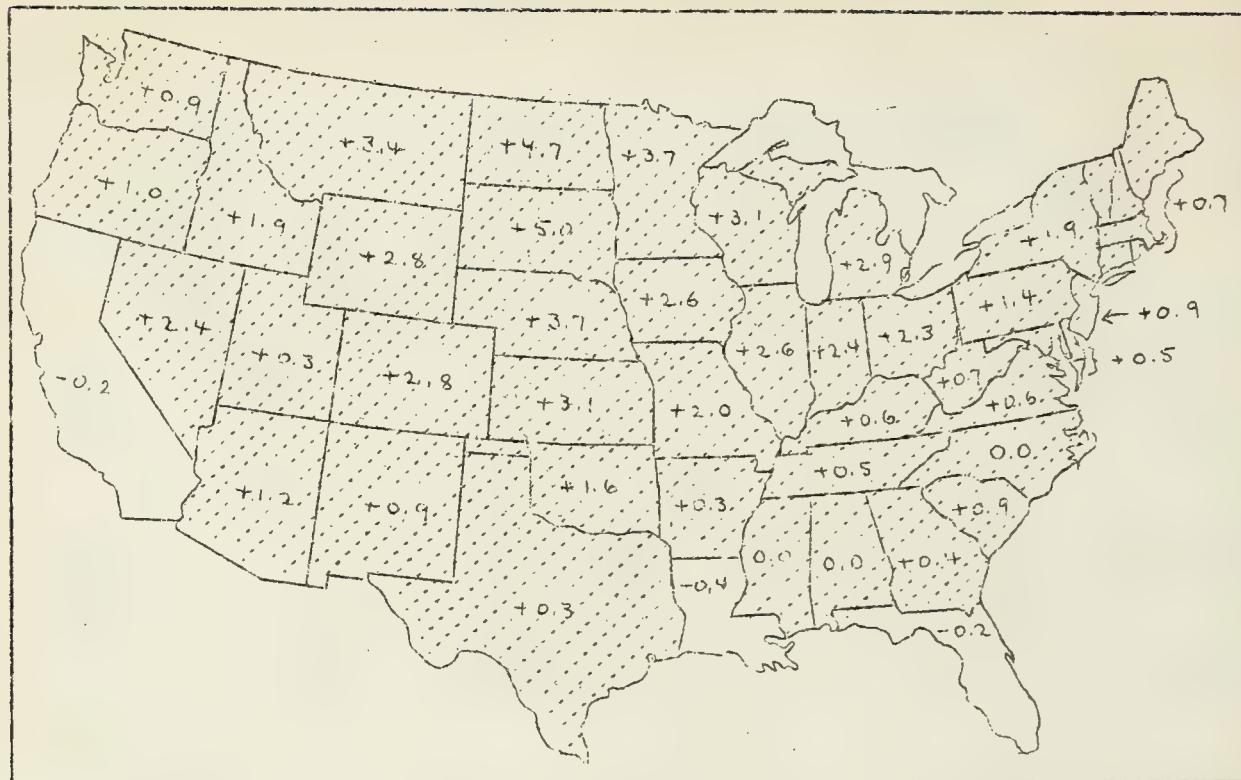


Fig. 3. Departure from the normal temperature for the summer, 1933, June to August, inclusive. Shaded: Normal or above.

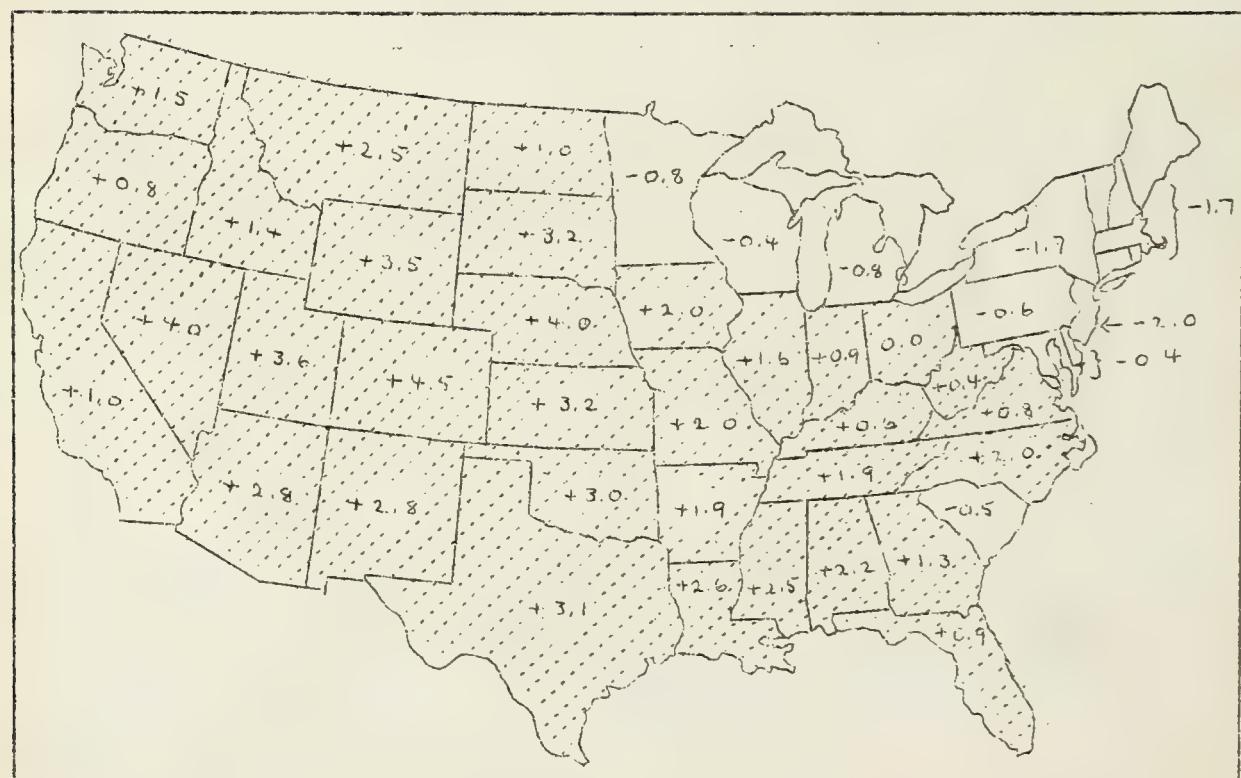


Fig. 4. Departure from the normal temperature for the autumn of 1933. September to November; inclusive. Shaded: Normal or above.

PRECIPITATION

9

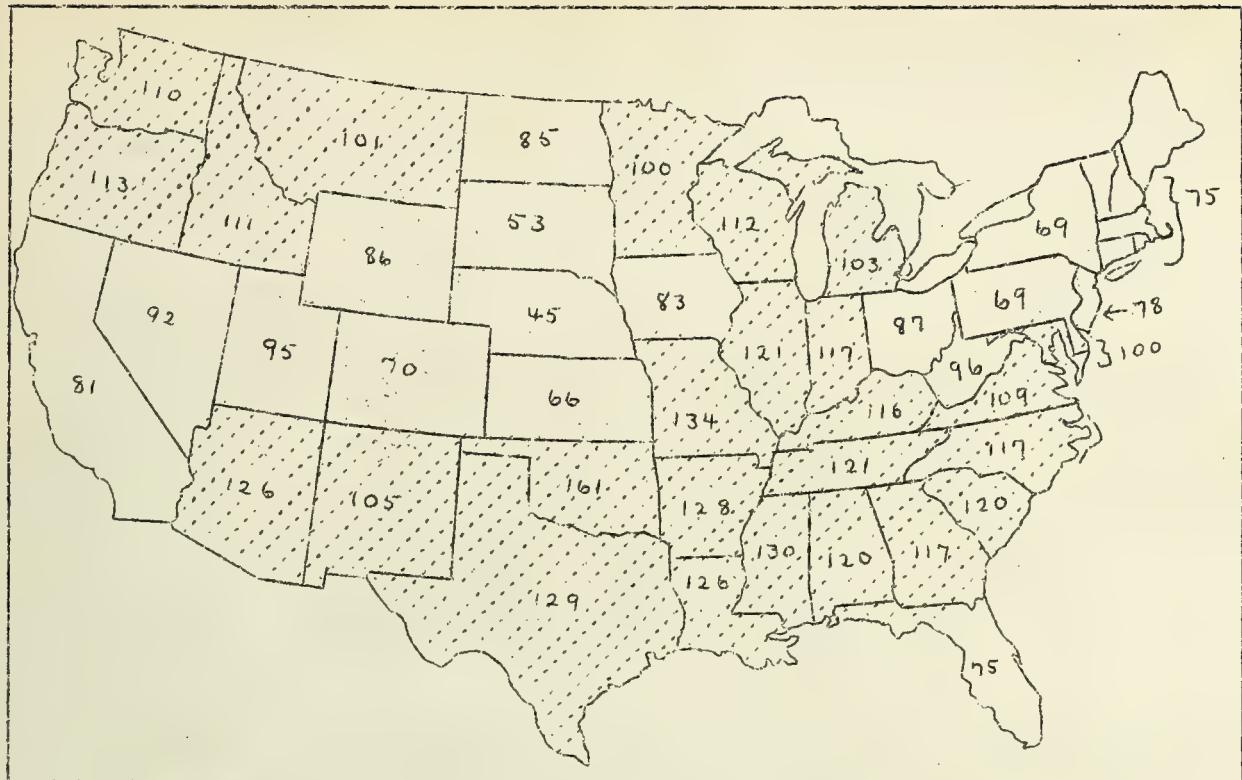


Fig. 5. Percentage of normal precipitation for the winter December, 1932 to February, 1933, inclusive. Shaded: Normal or above.

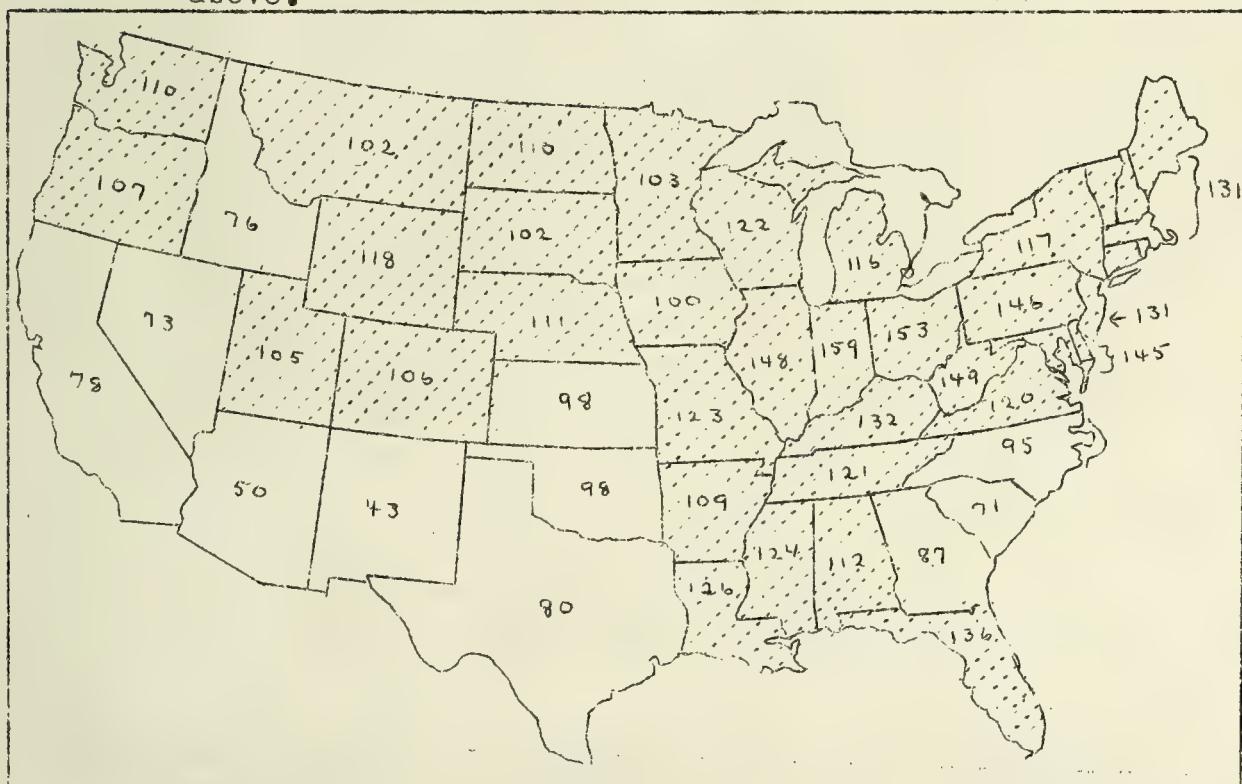


Fig. 6. Percentage of normal precipitation for the spring, March to May, 1933, inclusive. Shaded: Normal or above.

PRECIPITATION

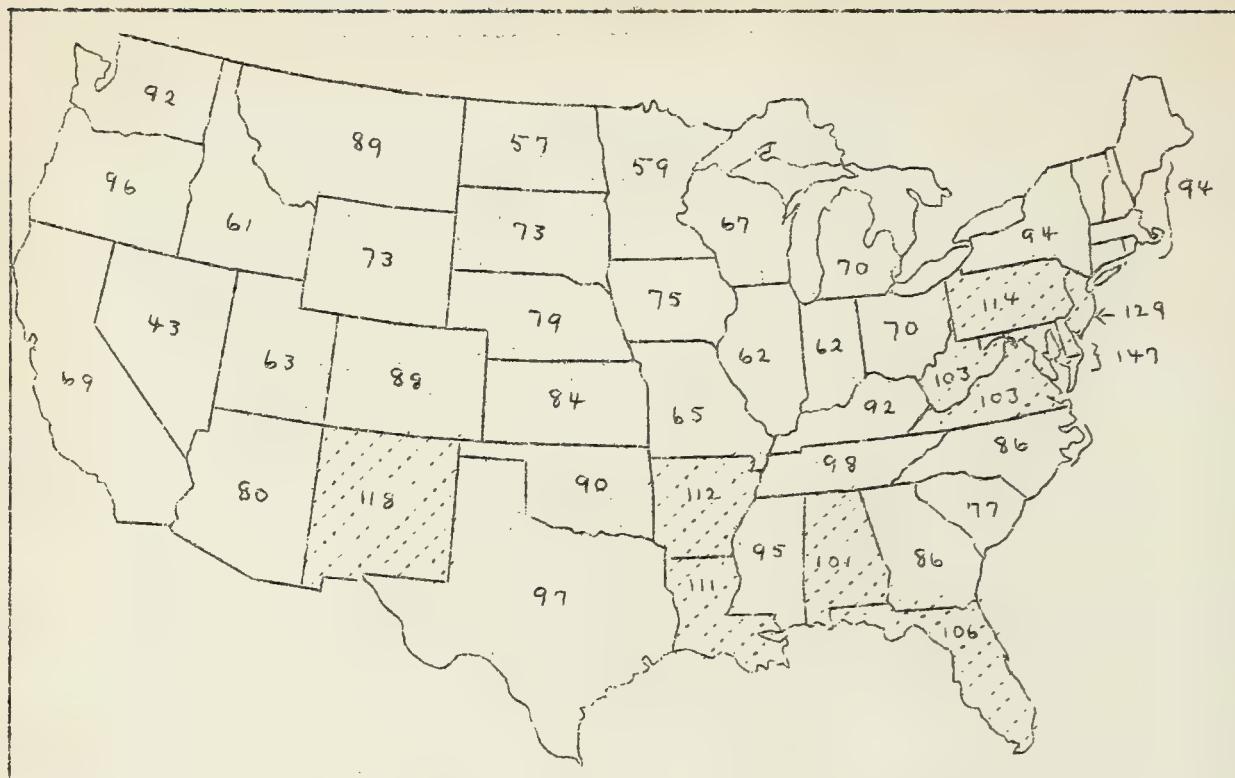


Fig. 7. Percentage of normal precipitation for the summer, June to August, 1933, inclusive. Shaded: Normal or above.

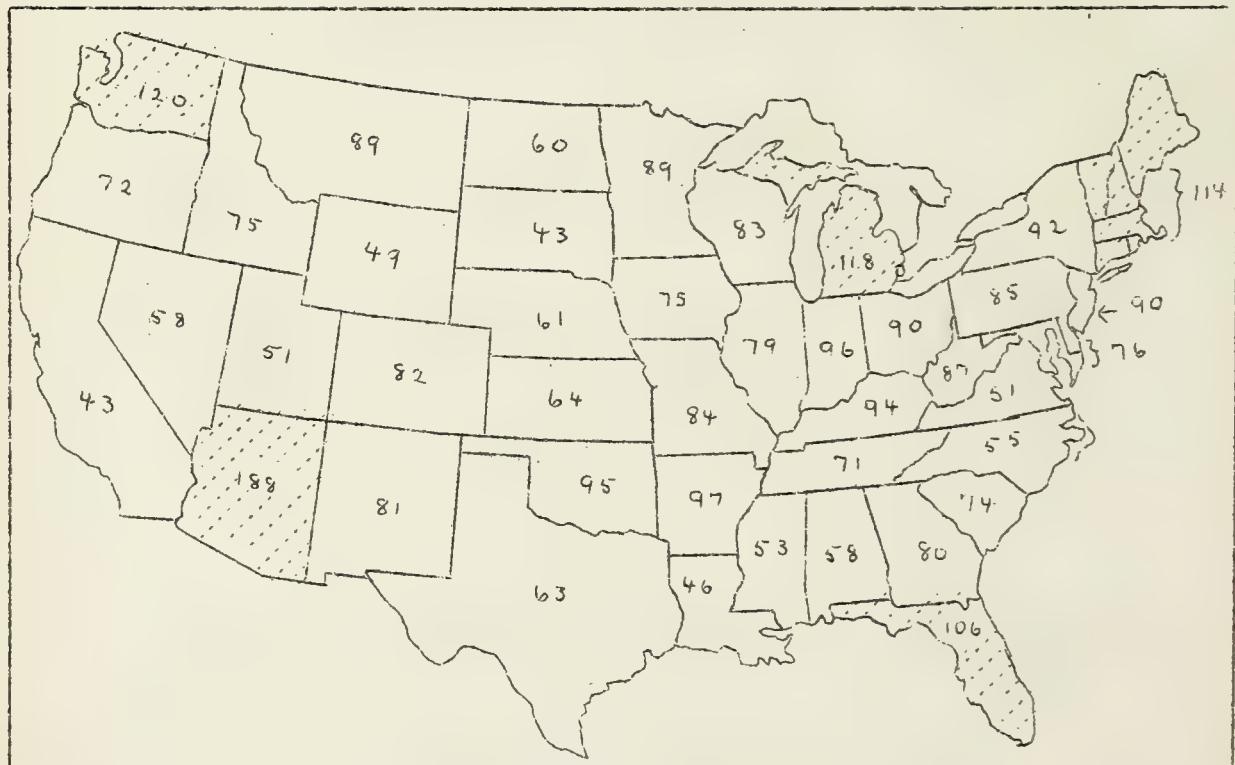


Fig. 8. Percentage of normal precipitation for the autumn, September to November, 1933. Shaded: Normal or above.

HARRISBURG, PENNSYLVANIA

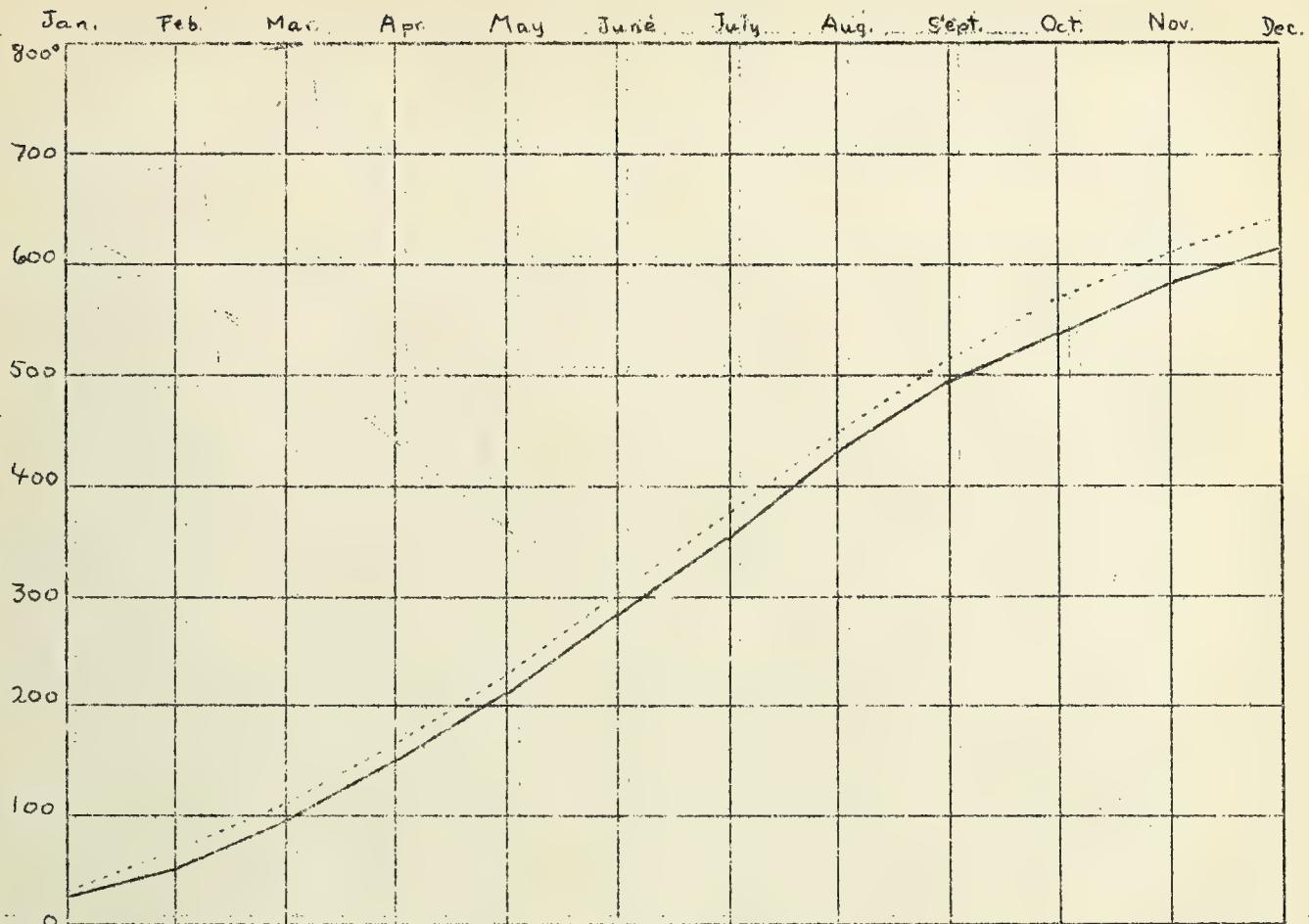


Fig. 9. Accumulated temperature in degrees F. for Harrisburg, Pennsylvania, 1933 (dotted line), compared with normal (solid line).

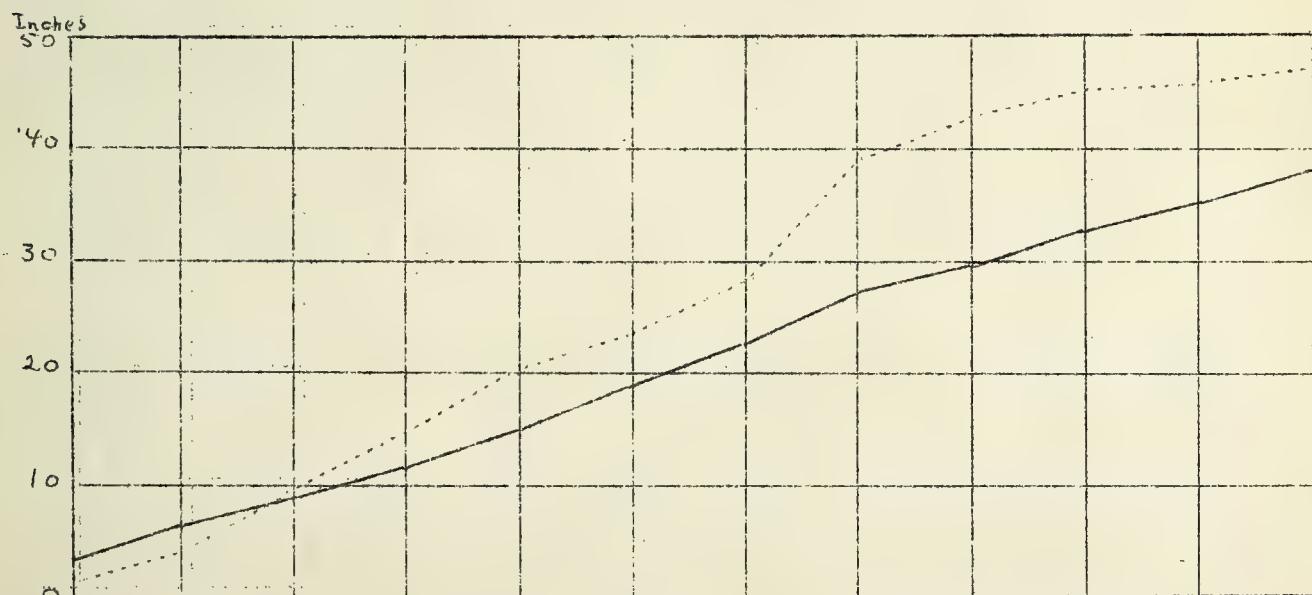


Fig. 10. Accumulated precipitation in inches for Harrisburg, Pennsylvania, 1933 (dotted line), compared with normal (solid line).

ATLANTA, GEORGIA

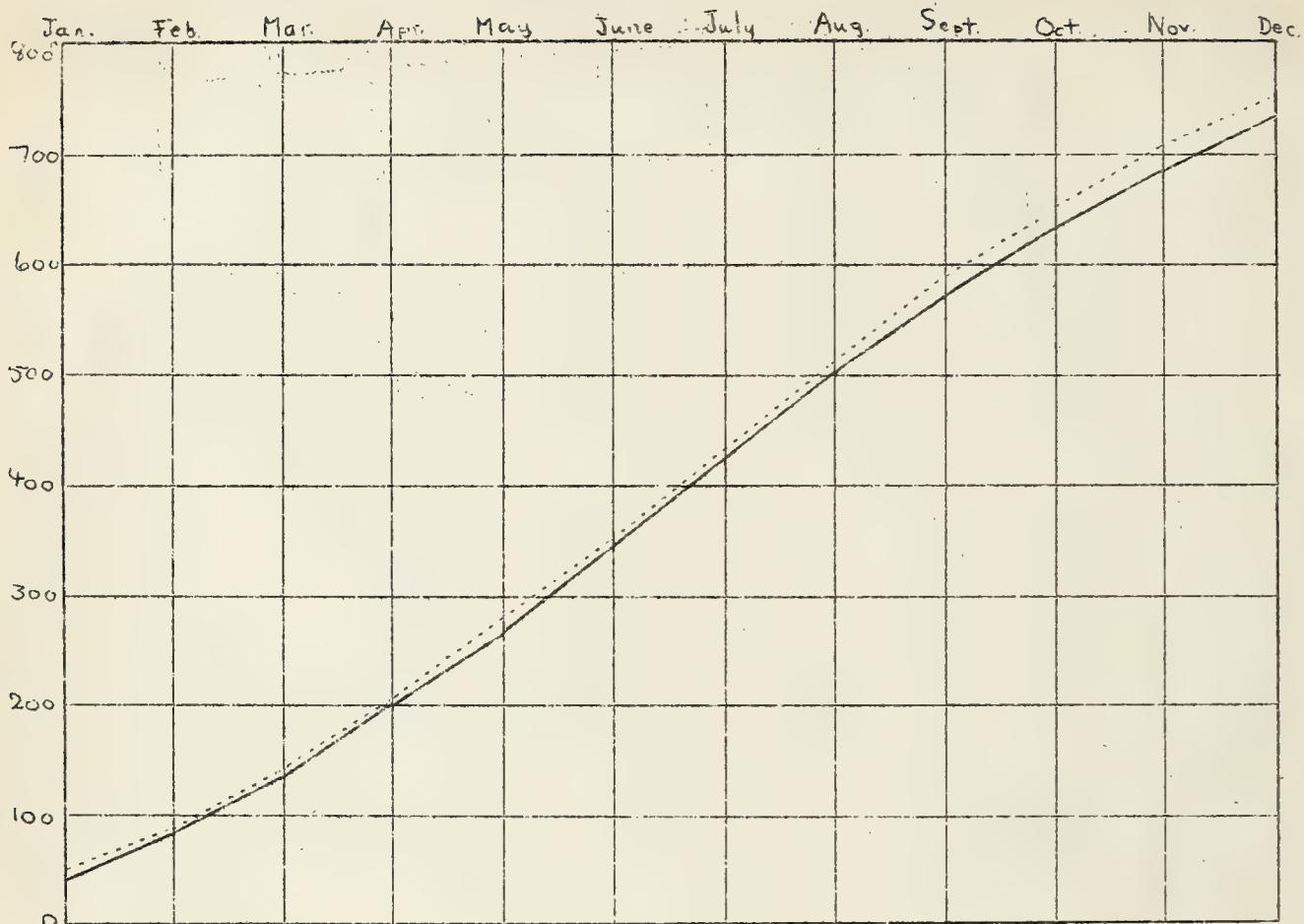


Fig. 11. Accumulated temperature in degrees F. for Atlanta, Georgia, 1933 (dotted line), compared with normal, (solid line).

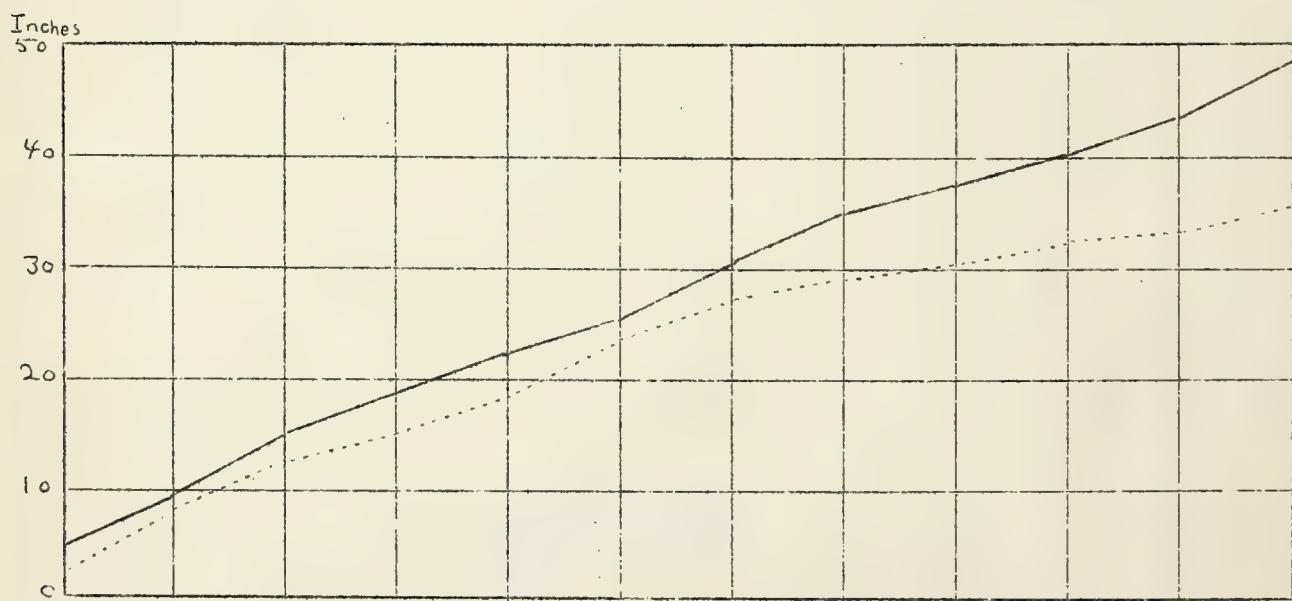


Fig. 12. Accumulated precipitation in inches for Atlanta, Georgia, 1933 (dotted line), compared with normal, (solid line).

BISMARCK, NORTH DAKOTA

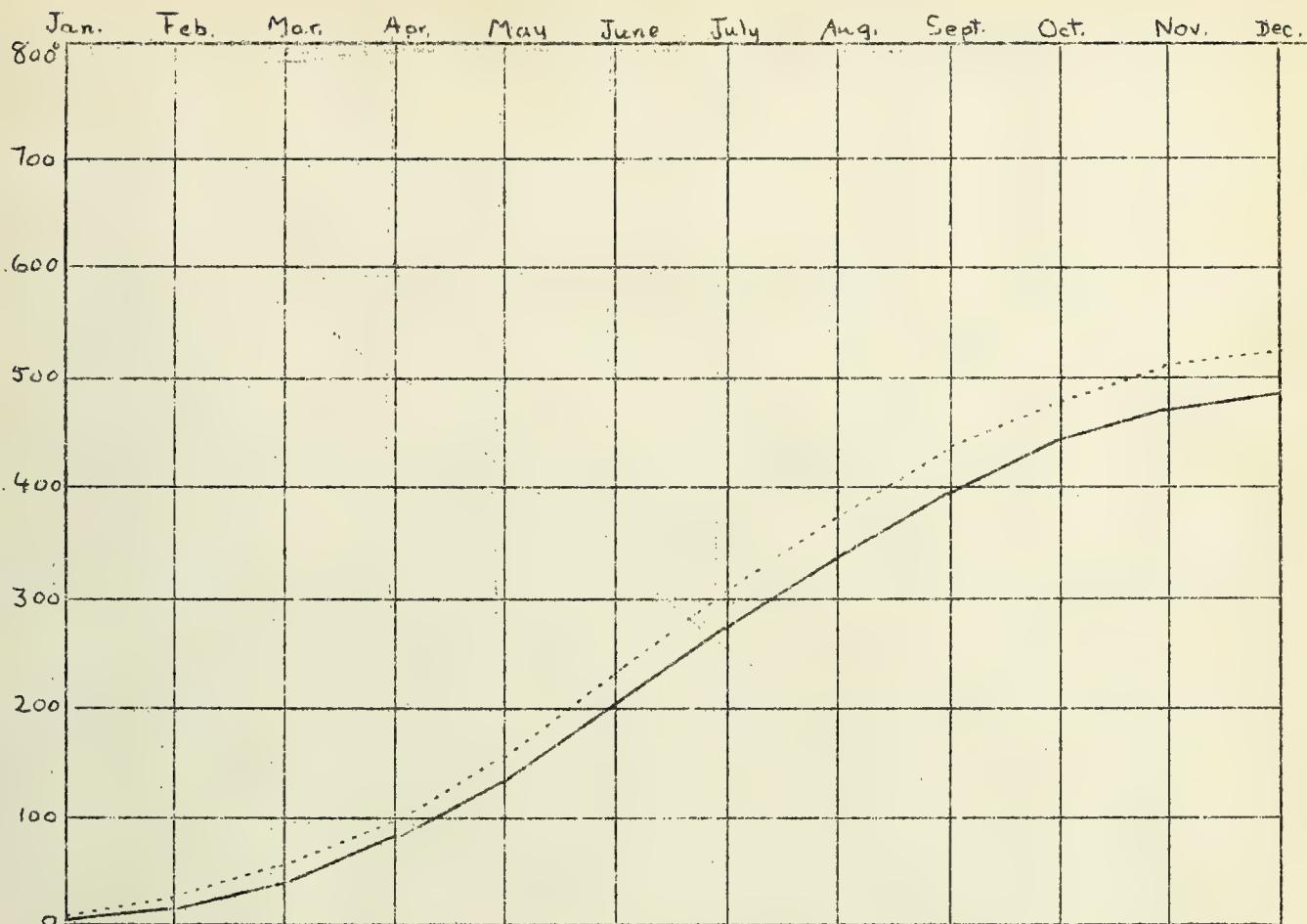


Fig. 13. Accumulated temperature in degrees F. for Bismarck, North Dakota, 1933 (dotted line), compared with normal (solid line).

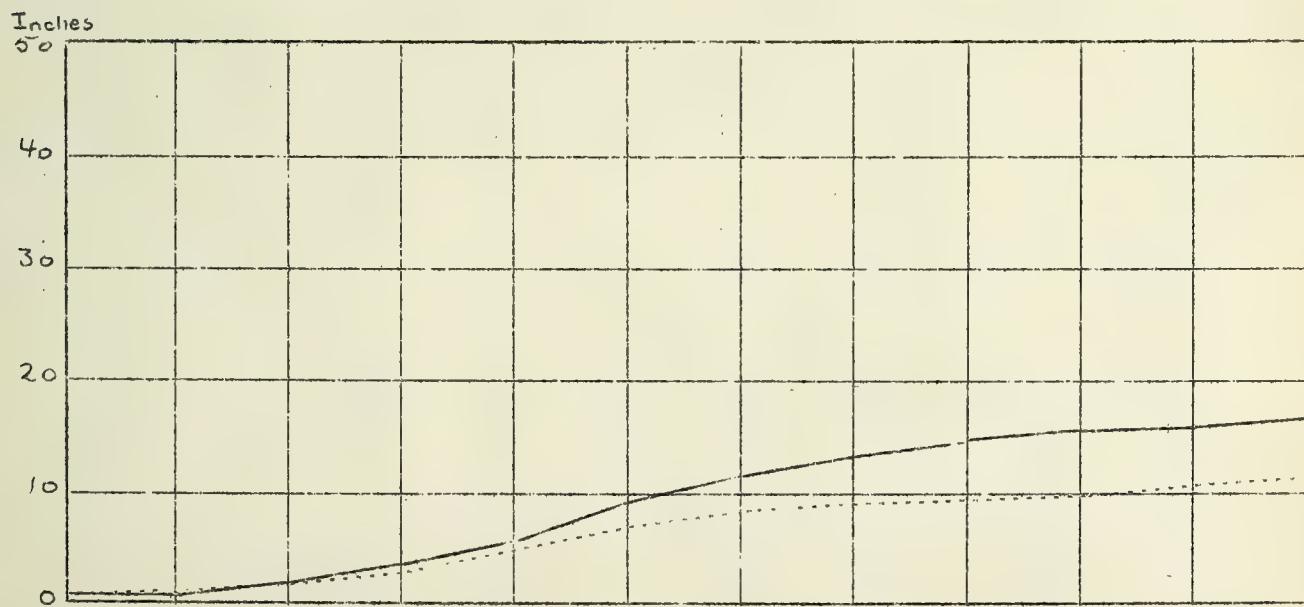


Fig. 14. Accumulated precipitation in inches for Bismarck, North Dakota, 1933 (dotted line), compared with normal (solid line).

LITTLE ROCK, ARKANSAS

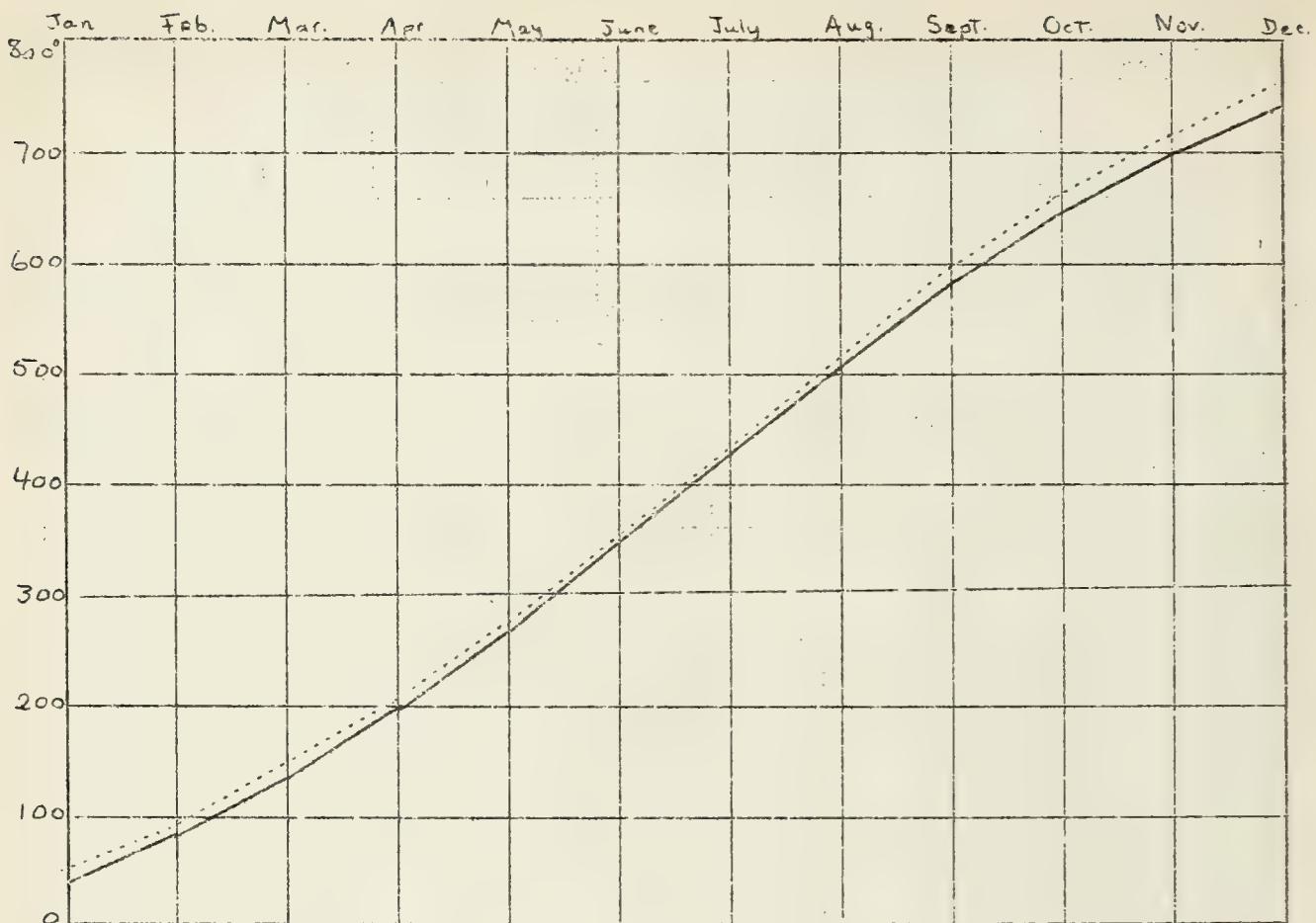


Fig. 15. Accumulated temperature in degrees F. for Little Rock, Arkansas, 1933 (dotted line), compared with normal (solid line).

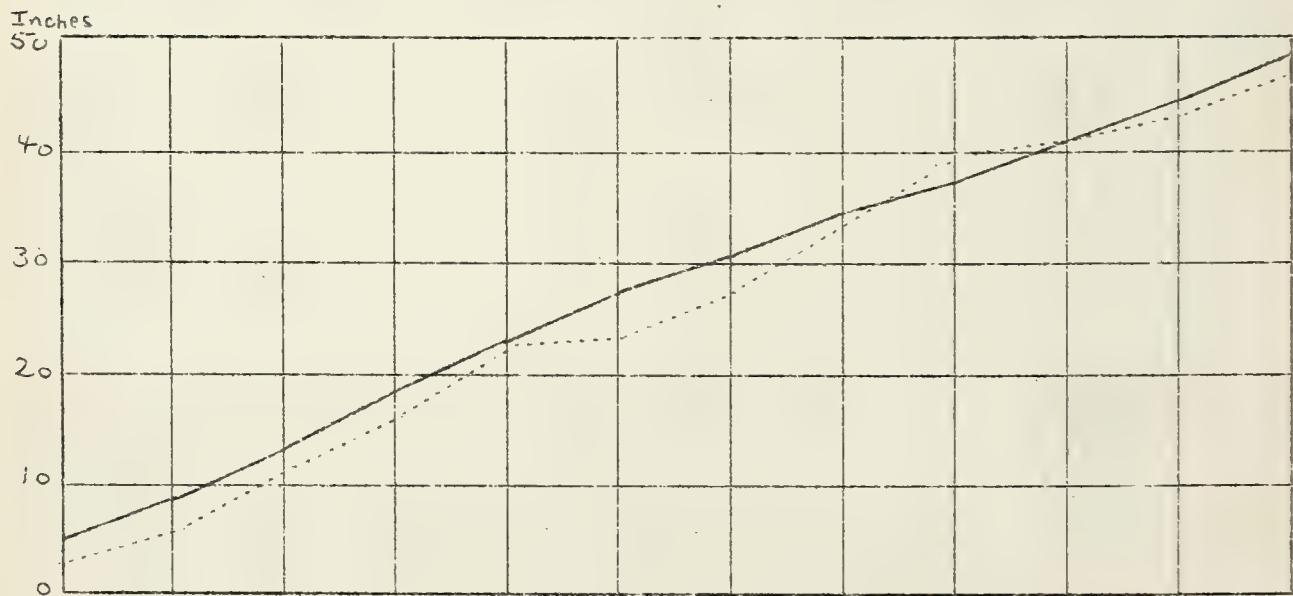


Fig. 16. Accumulated precipitation in inches for Little Rock, Arkansas, 1933 (dotted line), compared with normal (solid line).

PORTLAND, OREGON

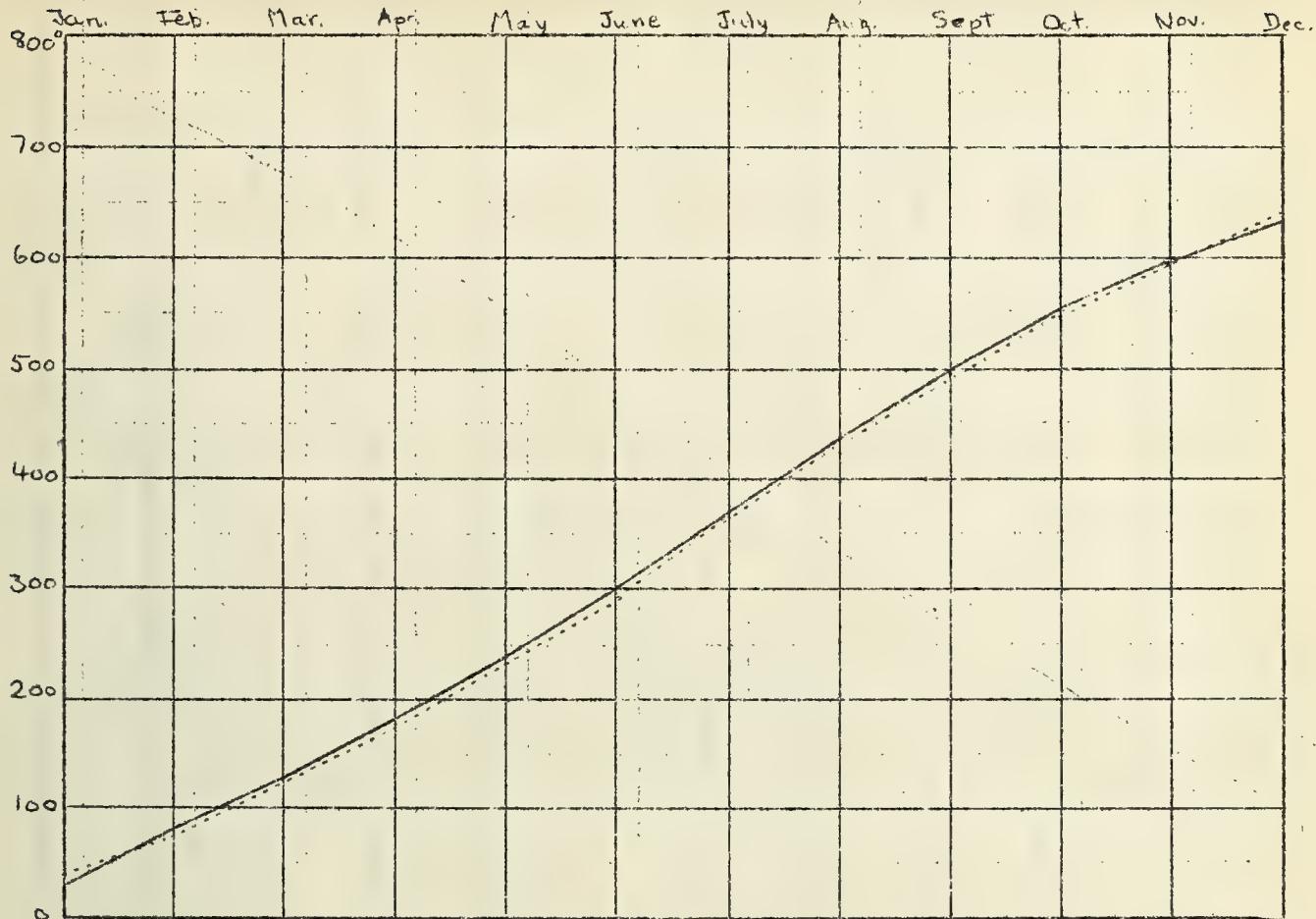


Fig. 17. Accumulated temperature in degrees F. for Portland, Oregon, 1933 (dotted line), compared with normal (solid line).

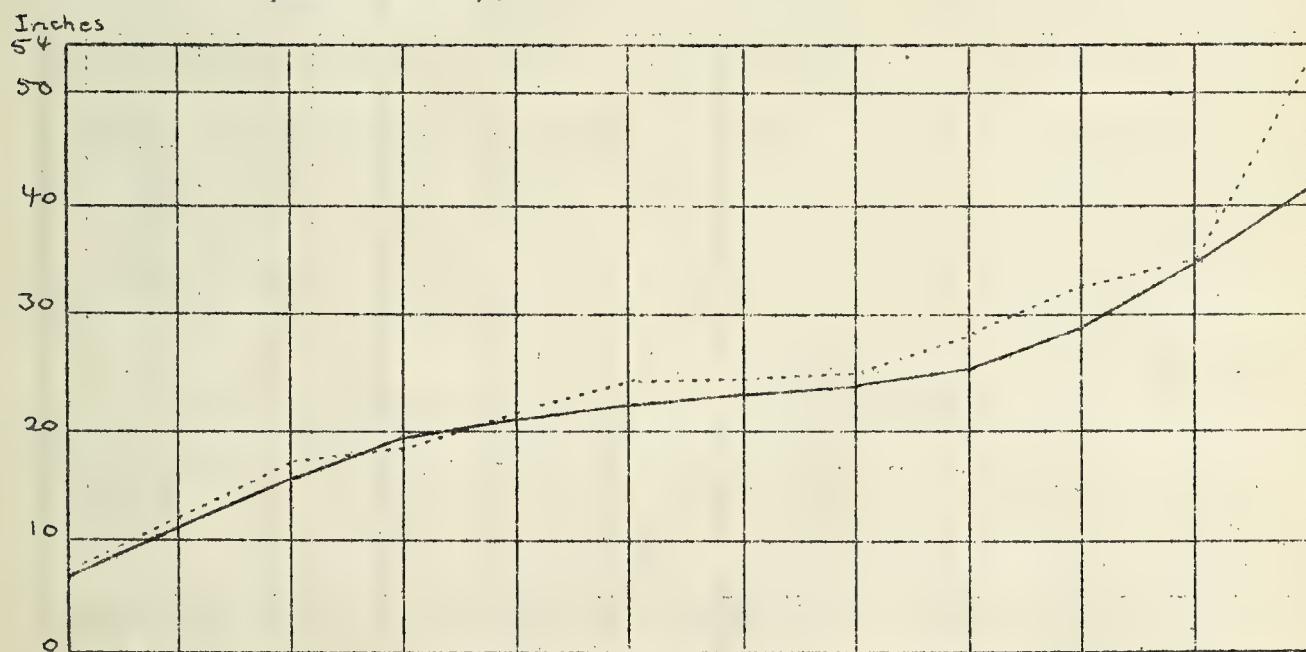


Fig. 18. Accumulated precipitation in inches for Portland, Oregon, 1933 (dotted line), compared with normal (solid line).

SACRAMENTO, CALIFORNIA

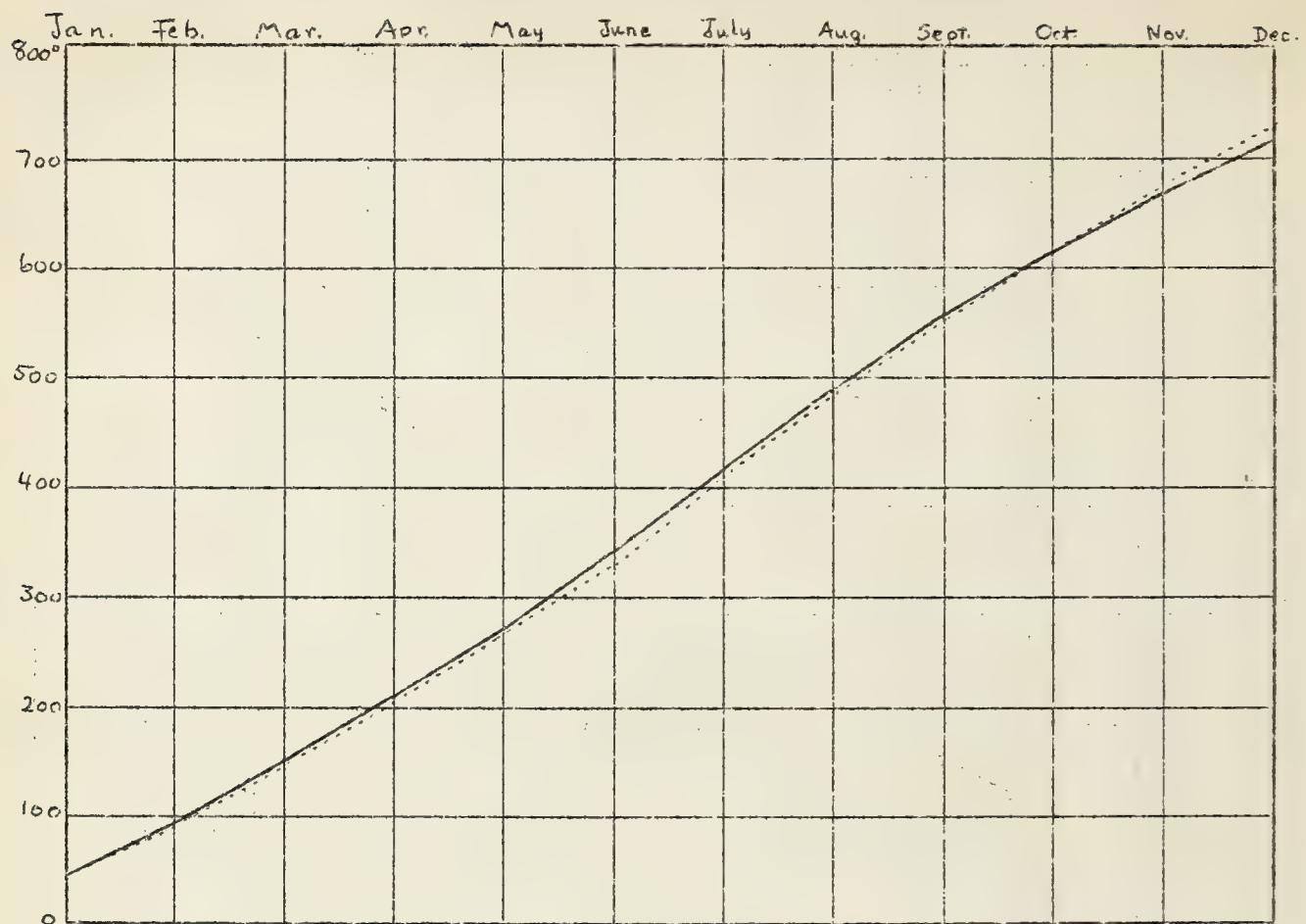


Fig. 19. Accumulated temperature in degrees F. for Sacramento, California, 1933 (dotted line) compared with normal (solid line).

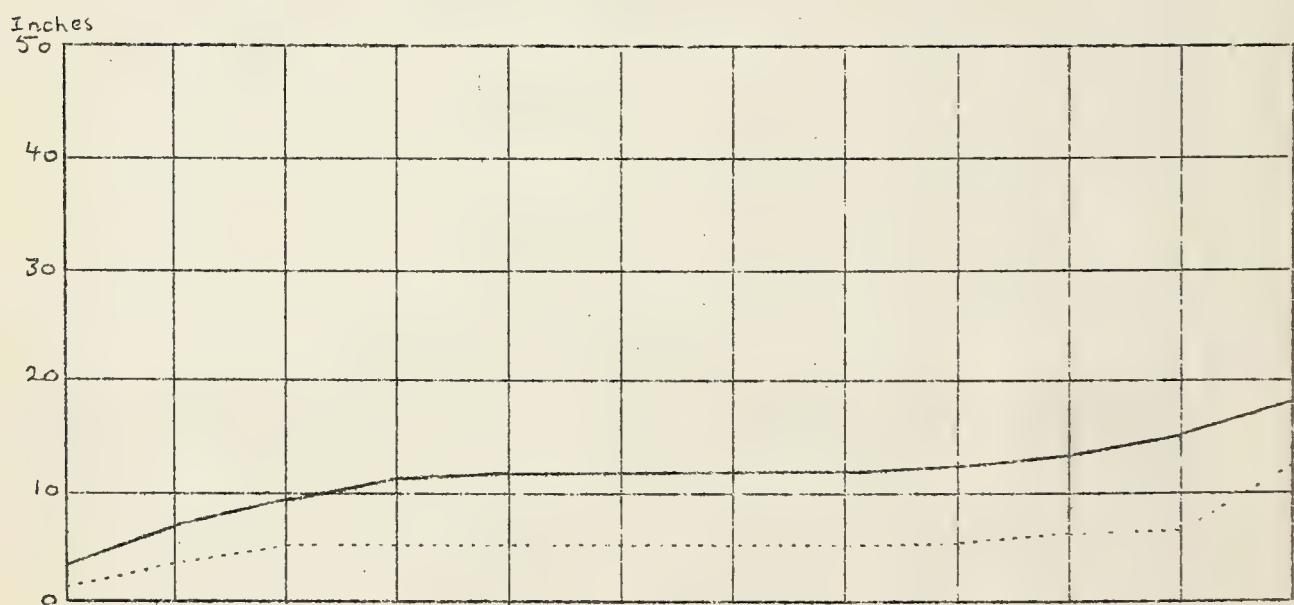


Fig. 20. Accumulated precipitation in inches for Sacramento, California, 1933 (dotted line), compared with normal (solid line).

DISEASES OF CEREAL CROPS

WHEAT

BUNT (Tilletia levis and T. tritici). In the 18 States reporting occurrence of bunt, the disease was more prevalent than in an average year in but one State, i. e., Michigan, where it was apparently as severe as in 1932, and caused losses ranging from 3 to 15 per cent. A survey of 72 fields of wheat in 12 counties of Pennsylvania showed an average of 0.76 per cent of bunted plants. Maryland reported less bunt than last year, as did, also, Illinois, Minnesota, North Dakota, Kansas, Colorado, and Oregon. Maximum losses ranged from a trace in Illinois and Wisconsin to 0.2 per cent in Iowa, 2 per cent in Colorado, 4 per cent in Missouri, 10 per cent in North Dakota, and 25 per cent in Kansas. The average loss for any one of the 18 States reporting bunt did not exceed 5 per cent, and for all but two others it was less than 3 per cent.

P. A. Young reported the successful overwintering of bunted wheat heads in Montana, stating that the viable spores borne by such heads were a source of infection of spring wheat drilled into stubble fields containing such heads. According to H. P. Barss, there was much winter killing of fall-sown wheat in Oregon. In many instances, the wheat thus destroyed was replaced by spring wheat, and there probably was less bunt than would otherwise have been the case.

The inspection of 24,653 cars of wheat in Minneapolis for the period July to December, 1933, inclusive, showed 3.1 per cent of them "smutty." Of a total of 2,887 cars of durum wheat inspected during the same period, 2.8 per cent graded smutty, whereas, in 1932, 15.5 per cent of the cars of durum wheat inspected in Minneapolis during the period August 1 to December 15 contained smut.

LOOSE SMUT (Ustilago tritici). The prevalence of loose smut in Ohio, Illinois, Michigan, Wisconsin, Minnesota, Missouri, Wyoming, and Colorado was about equal to that of 1932. In Pennsylvania, Maryland, and Indiana, it was somewhat more prevalent than last year and than obtains in an average year. Losses varied from a mere trace, as in Colorado, to as much as 3.8 per cent, as in Pennsylvania, where one field showed as much as 16 per cent. The percentage losses reported for the remaining States from which reports were received, are as follows: Maryland, 1.5; Ohio, 1; Illinois, 1.2; Michigan, 3; Wisconsin, trace; Minnesota, 1; Missouri, 2; North Carolina, 0.5; North Dakota, 0.4; Kansas, 0.1; and Oregon, trace. In North Carolina, loose smut was observed in 41 of 61 fields in 7 counties, with infection ranging from a trace to 4 per cent.

FLAG SMUT (Urocystis tritici). Flag smut was observed by the late Dr. J. A. Faris in Madison County, Illinois, and Leavenworth County, Kansas. Infection amounting to a trace was recorded in 4 fields in St. Louis County, Missouri. No new locations were discovered.

STEM RUST (Puccinia graminis tritici). Although stem rust was reported present prior to July 1 in the Midwestern States from the Gulf of Mexico to the Canadian border and in sufficient degree to have resulted in an epidemic, the excessively hot, dry weather of July inhibited urediospore production and germination and hastened the premature ripening of the wheat. There was an abundance of rust infection of the common barberry by June 1, and its spread to nearby grains and grasses was recorded. Weather conditions, however, inhibited its further extension geographically. The abundance of inoculum present during the season as a whole was, however, relatively slight.

Of the 15 States reporting incidence of stem rust, 5 reported it less prevalent and 2 much less so than in 1932, and, with a single exception (Ohio) no State reported an average loss in excess of a trace. Ohio reported a loss of 0.5 per cent.

LEAF RUST (Puccinia triticina). The excessively high temperature and the rainfall deficiency generally prevalent during the 1933 growing season, in all but a few of the States in which wheat production is commercially important, inhibited tremendously the prevalence and severity of leaf-rust infection. In many States, the first appearance of the rust was later than usual and, in others, notably North Dakota, Montana, and Oregon, the severity ranged from a trace to 10 per cent. In Pennsylvania, Maryland and Delaware, where there was more abundant rainfall, leaf rust was more than usually severe, the average infection for Pennsylvania being estimated at 82 per cent. The average loss for the remaining 25 States reporting leaf rust ranged from a trace in Michigan, Minnesota, Iowa, North Dakota, Kansas, Montana, and Oregon to 4 per cent in Maryland and 5 per cent in Indiana. In North Carolina, the infection severity amounted to less than 10 per cent in most cases and nothing at all in others. Tennessee reported "Very abundant in all fields observed," but gave no specific information as to prevalence and severity. Texas reported leaf rust widely prevalent but causing noticeable injury to none but the most susceptible varieties.

STRIKE RUST (Puccinia glumarum) was less prevalent in Montana than in 1932 and somewhat less so than in an average year. Conditions affecting its winter survival apparently were unfavorable throughout its range in the Pacific and intermountain States. In the Flathead Valley, the loss caused by this rust ranged from a trace to 80 per cent. Jones Fife and Jenkin were, as usual, highly susceptible.

SCAB (Gibberella saubinetii). Because of unfavorable weather conditions during blossoming of the host, the losses from scab were relatively unimportant. In Pennsylvania, 91 per cent of the fields inspected showed infection ranging from a trace to 20 per cent. A survey of 72 fields showed an average of 1.5 per cent of the spikelets infected. In 6 of the 11 States reporting incidence of scab, the loss was no greater than that recorded for 1932. In 6, it was less to much less than that of an average year.

GLUME BLOTHC (Septoria nodorum) was general and severe in Pennsylvania, where it was present in all fields inspected. Twenty-five per cent of the spikelets in those fields bore infection. In Illinois, Indiana, Missouri, and Kansas, the disease was of local distribution, and the losses did not exceed a trace. In Maryland, the loss amounted to 5 per cent. Only 7 States reported any infection whatever. Here, again, the inimical weather conditions undoubtedly affected the prevalence and economic importance of the disease.

SEPTORIA LEAF BLIGHT (Septoria tritici) was reported from Illinois, Indiana, and Oregon. In Illinois, it caused an estimated loss of 0.5 per cent, was "moderately" destructive in Oregon; and, though much more prevalent in Indiana it caused no more than a trace of loss.

BACTERIAL DISEASES: BASAL GLUME ROT (Bacterium atrofaciens) was reported as occurring in Illinois and Kansas. Weather conditions were unfavorable to its development, and the amount of damage was negligible in Kansas. In Illinois, the maximum infection was approximately 1 per cent. BLACK CHAFF (Bacterium translucens undulosum) was recorded for Illinois, Wisconsin, Minnesota, and Iowa. In Iowa, it was more prevalent than in many years past.

TAKE ALL (Ophiobolus graminis). Take all was reported by Hurley Fellows as of scattered occurrence in Kansas, where it caused an estimated loss of 0.5 per cent. He observed no varieties that manifested any resistance to the causative organism. Take all, usually present in western Oregon and Washington, was generally absent in 1933, because of severe winter injury. No other States reported incidence of the disease.

FOOT AND ROOT ROTS. Chief among the causative organisms associated with foot and root diseases of wheat were Helminthosporium sativum, Fusarium spp., Cercosporaella herpotrichoides, and Gibellina cerealis. Of these H. sativum was reported from Ohio, Michigan, Wisconsin, Minnesota, Kansas, and Montana. In Montana, it and Fusarium spp. caused serious foot-rot damage in fields of Turkey wheat near Great Falls, according to P. A. Young. In the other States, the damage resulting from these fungi did not average more than a trace. In Washington and Oregon, according to Roderick Sprague, the excessive winter killing in December, 1932, reduced the loss caused by Cercosporaella root rot to an amount less than average, except in the Grande Ronde Valley, Oregon, and in the vicinity of Spokane, Washington, where the loss approached that of the record year 1928. Bromus tectorum, Agropyron inerme, A. riparium, and Koeleria cristata were attacked near Liberty Lake, Washington. Sprague reported also the occurrence of foot rot caused by Gibellina cerealis, hitherto recorded only for Italy. It has been under observation for several years along the Oregon coast, where it causes some damage to wheat and oats when grown on somewhat acid soil.

POWDERY MILDEW (Erysiphe graminis). Scattered infections of powdery mildew were reported from New Jersey, Indiana, Michigan, Montana, and Washington. It was locally severe in New Jersey and near Bozeman, Montana.

ERGOT (Claviceps purpurea) was reported as scatteringly prevalent in Ohio, Michigan, Wisconsin, Minnesota, and North Dakota. In the latter State, there was heavy infection in occasional fields of both durum and common varieties.

NEMATODE DISEASE (Anguillulina tritici) was present in North Carolina.

MOSAIC (Virus). Benjamin Koehler and H. H. McKinney inspected several wheat fields in Illinois and found mosaic rosette causing noticeable damage in 5 fields of so-called Hardy Fultz. From 10 to 50 per cent of the plants in these fields were infected. Yellow mosaic was found in the varieties Kharkov, Turkey, and Duffy. Three fields of Turkey, totaling about 45 acres showed mosaic in 10 to 30 per cent of the plants.

R Y E

STEM RUST (Puccinia graminis secalis) was reported from New Jersey, Arkansas, Ohio, Illinois, Indiana, Michigan, Wisconsin, and Minnesota. In none of these States, excepting Ohio, was the loss more than a trace. Ohio reported damage amounting to 0.5 per cent. Wisconsin reported this rust destructive only near infected barberry bushes.

LEAF RUST (Puccinia dispersa). This rust was generally distributed throughout Indiana and Minnesota, of scattered distribution in Massachusetts, Florida, and Connecticut, and local in Wisconsin and Oregon. In Massachusetts, Florida, Ohio, and Indiana, the loss from leaf rust ranged from 1 to 5 per cent. Elsewhere, it did not average more than a trace. One field in Illinois showed a maximum of 100 per cent severity.

ERGOT (Claviceps purpurea). Ergot was reported prevalent in Massachusetts, Ohio, Michigan, Wisconsin, Minnesota, Iowa, and North Dakota. In Wisconsin and Minnesota, it was more than usually so, causing in the one an estimated loss of 2.5 per cent and in the other, 1 per cent. Elsewhere, there was no more than a trace, except in Ohio, where the loss was estimated at 0.1 per cent.

STEM SMUT (Urocystis occulta) was observed in Anderson County, Tennessee, by P. R. Miller, in a single field in Shelby County, Indiana, and in Minnesota.

SCAB (Gibberella saubinetii). Scab on rye was reported from Ohio, Wisconsin, and Illinois. In Ohio, it caused an estimated loss of 1 per cent; in Illinois, 3 per cent. Weather conditions were unfavorable for general incidence of scab infection.

POWDERY MILDEW (Erysiphe graminis) was observed in Connecticut, New Jersey, and Michigan. Reported as severe in many New Jersey fields.

ANTHRACNOSE (Colletotrichum cereale). Scattered infections in Illinois and Wisconsin.

SPOT BLOTH (Helminthosporium sativum); traces in Michigan.

B A R L E Y

COVERED SMUT (Ustilago hordei). General distribution of covered smut was reported from Illinois, Minnesota, and North Dakota. Scattered infections were observed in Delaware, Maryland, Tennessee, Georgia, Ohio, Michigan, Wisconsin, Iowa, Kansas, Colorado, Arizona, Oregon, and Washington. Losses were estimated as follows: Maryland, 8 per cent; Michigan, 1; Minnesota, 0.5; Iowa, 0.2; North Dakota, 0.5; and Kansas, 0.5. The maximum infection observed anywhere was .57 per cent in Illinois. The losses caused by this smut were, in general, about equal to those recorded in any average year. Delaware, Ohio, Michigan, Wisconsin, and Colorado reported less than average.

LOOSE SMUT (Ustilago nuda). Loose smut was reported as of general distribution in Illinois, Wisconsin, Minnesota, North Dakota, and Kansas. Other States reporting this smut were New Jersey, Maryland, Virginia, North Carolina, Arkansas, Ohio, Michigan, Iowa, Colorado, and Oregon. Losses ran from a trace in New Jersey and Colorado to 0.5 per cent in Michigan and North Dakota; 1 per cent in Minnesota, Ohio, and Maryland; 1.5 per cent in Illinois; 2 per cent in Kansas; and 2.5 per cent in Wisconsin. Maximum infections were reported as follows: North Carolina, 10 to 20 per cent; Wisconsin, 20 per cent; Minnesota, 10; and Illinois, 6. In Kansas, loose smut continues to cause greater losses than any other disease of barley.

STEM RUST (Puccinia graminis tritici) was relatively unimportant. It was generally less prevalent than last year and in an average year, except in Minnesota, where there was more than usual, an occasional field showing infections of from 50 to 75 per cent. Losses were reported from Maryland, Illinois, Minnesota, Iowa, Michigan, North Dakota, Wisconsin, and Colorado as no more than a trace. In Ohio, there was an estimated loss of 1 per cent. The weather conditions were everywhere inimical to the development and spread of stem rust.

LEAF RUST (Puccinia anomala) was reported from Maryland, New Jersey, Arkansas, Ohio, Illinois, Michigan, Wisconsin, Minnesota, Kansas, Colorado, and Oregon. Losses ranged from a trace to 0.5 per cent. Maximum infections of 70 (Minnesota) and 100 per cent (Illinois) were recorded.

STRIKE (Helminthosporium gramineum). The presence of stripe was reported from Maryland, North Carolina, Illinois, Wisconsin, Minnesota, North Dakota, Kansas, and Colorado. It was more than usually severe in Maryland, where it caused an estimated loss of 1 per cent. In North Carolina, losses in a few fields were as much as 30 to 47 per cent. Elsewhere, the losses ranged from a trace in Colorado to as much as 3 per cent in Iowa. The following varieties were apparently resistant: Wisconsin 37 and 38, Peatland, Minsturdi, and Svansota. Trebi was reported as immune at University Farm, Minnesota.

SPOT BLOTH (Helminthosporium sativum). Spot blotch was reported prevalent in Michigan (trace), Wisconsin (1 per cent), Minnesota (2 per cent), Iowa (5 per cent), and North Dakota (trace). It reached epidemic proportions in Cass County, North Dakota, and caused a great deal of leaf spot on leaves and glumes in Wisconsin. Symptoms on glumes are easily confused with those of scab, agar or blotter cultures often being necessary to distinguish the causative organism. In Iowa, the spot blotch of the leaves often was accompanied by a well defined foot rot possibly attributable to H. sativum.

SCAB (Gibberella saubinetii) was of little economic consequence, the damage amounting in no instance to an estimated 3 per cent. It was reported present in New Jersey, Maryland, Ohio, Illinois, Michigan, Iowa, and Wisconsin. According to R. E. Vaughan, its occurrence in Wisconsin was limited to a few fields in the southern counties. "Fall plowing of corn ground and high temperatures with low humidity in June cut down infection." In Illinois, 310 carloads of barley from 30 counties graded "scabby."

ERGOT (Claviceps purpurea). Ergot was unusually prevalent in Illinois, Wisconsin, Minnesota, and North Dakota. The loss occasioned by it was in no State, except Wisconsin, more than a trace. Wisconsin reported 0.5 per cent. In Minnesota many samples from the Red River Valley contained from a trace to 0.5 per cent. North Dakota reported more ergot in the Red River Valley than had occurred there since 1923. In Wisconsin, the hot, dry season hastened blossoming and brought the plants into the infection period while they were in bloom. Ergot was especially severe where the grain was fertilized to further hasten maturity.

POWDERY MILDEW (Erysiphe graminis). Traces of powdery mildew were reported from Connecticut, New Jersey, Maryland, Illinois, and Wisconsin.

SCALD (Rhynchosporium secalis) was reported locally prevalent in Wisconsin and sparsely so in Oregon. Its development in Wisconsin was greatly inhibited by drought. Its scattered incidence in Oregon is attributed to the severe freezing weather of December, 1932. In neither State was the damage more than a trace.

BACTERIAL BLIGHT (Bacterium translucens). There was an unusually severe outbreak of this disease in Illinois in 1933. Its marked development was coincident with the unusually wet weather of May. Some barley

fields were nearly ruined. Leaves showed the characteristic stripe with exudate. Young plants 6 or 8 inches in height showed much exudate at leaf bases, where leaves are close-packed together. Many plants died in this condition. It was not conclusively established that this severe attack of the leaf bases were caused by B. translucens.

O A T S

SMUTS, LOOSE AND COVERED (Ustilago avenae and U. levis). Losses caused by smut were approximately equal to those recorded for 1932. Reports were received from 22 States, with average losses ranging from 1 to 10 per cent. The value of seed treatment is now well and widely known among farmers, but treatment costs money, a commodity too many do not have after a long, lean winter. The low price paid for oats in 1933 put no premium on seed treatment, hence occasional losses of 12 to 50 per cent were not uncommon. Percentage losses were estimated as follows: Massachusetts, 10; North Carolina, 9; Kansas and Wisconsin, 6 each; Illinois, 5.5; Iowa, 5; Maryland, 5; Florida and Ohio, 4 each; Missouri, 3; Minnesota, 2; Michigan, 1; and North Dakota, 0.5.

STEM RUST (Puccinia graminis avenae) was reported prevalent in 16 States, in all but 2 of which it was less prevalent than last year and generally less to much less than in an average year. The unusually hot, dry weather in the principal oat-growing States and, in some instances, a scarcity of initial inoculum were chiefly responsible for the relatively insignificant damage from this rust. Although occasional fields in Minnesota, Illinois, and Oregon showed as much as 50 per cent severity or more, the average loss in but two States - Ohio and Michigan - was as much as 0.5 per cent. Elsewhere, the average loss did not exceed a trace.

CROWN RUST (Puccinia coronata). Because of heat and drought, damage resulting from crown rust was of little importance except in Florida, where the loss was estimated at approximately 30 per cent, and in Hyde County, North Carolina, where the loss was 33 per cent. Estimates from other States follow: Indiana, 3 per cent; Maryland, 2; Missouri, 1; Illinois, 0.5; elsewhere, a trace or less.

FOOT ROT (Helminthosporium spp. and Fusarium sp.) was observed in Iowa, Michigan, and Oregon. Fusarium foot rot was severe in the Astoria (Oregon) region, where it caused irregular stunted patches.

SCAB (Gibberella saubinetii). Observed in Maryland, Ohio, Wisconsin, and Illinois.

HALO BLIGHT (Bacterium coronafaciens) was reported from Randolph County, Illinois.

BLAST (Cause unknown) was reported as of some economic importance in Kansas and North Dakota, where it caused an estimated loss of 0.5 per cent.

C O R N

SMUT (*Ustilago zae*). Of the 23 States reporting incidence of corn smut, 4 reported more and 1 much more than last year and also than for an average year. Percentage losses were estimated as follows: Iowa, 6; Massachusetts, Ohio, and Michigan, 5; New York, 2 to 4; Kansas, 3; North Dakota, 2; Illinois, 1.5; Missouri, 1; Florida and Maryland, each 0.5. In Georgia, the percentage of ear infection was unusually high, a field of Late Prolific showing as much as 50 per cent. In Iowa and Wisconsin, sweet corn was more severely affected than were varieties of field corn.

RUST (*Puccinia sorghi*). Rust was reported as sparsely to generally prevalent in 14 States; in only two (Florida, 3 per cent and Massachusetts, 1 per cent), however, was the average loss more than a trace. Maximum infections of 75, 70, and 25 per cent were recorded in Florida, Massachusetts, and Minnesota, respectively. According to J. H. Miller reporting for Georgia, rust is of late incidence and causes some injury to the fodder.

ROOT, STALK, AND EAR ROTS (Various organisms).

ROOT ROTS. Disease very severe in North Carolina fields deficient in potash. Data taken in 49 fields in 24 Illinois Counties showed an average infection of 10 per cent. Elsewhere, root rot caused losses averaging 5 per cent in Florida, 1.5 per cent in Missouri, and 0.5 per cent in Michigan.

STALK ROTS, were reported from Maryland, North Dakota, and Arizona.

EAR ROTS. Ear rots were observed in the following States: Florida, Massachusetts, Iowa (Gibberella saubinetii), Illinois and Missouri (various organisms), Maryland, New Jersey, Mississippi, Iowa, Wisconsin, Michigan, and New Hampshire (Fusarium moniliforme).

BLACK BUNDLE (*Cephalosporium acremonium*) was observed in Indiana (trace) and in Illinois (4 per cent).

BASISPORIUM DRY ROT (*Basisporium gallarum*) was reported from Iowa (1.5 per cent), Wisconsin (0.5 per cent) and Illinois (5 per cent).

DIPLODIA DRY ROT (*Diplodia zae*). This disease was reported prevalent in Florida (3 per cent), Iowa (4), Ohio (1), Indiana (2.5), Michigan (0.5), Illinois (2.8), Mississippi, and Missouri. D. frumenti and D. macrospora were also reported from Florida, the former with a loss of 1 per cent, the latter of 3 per cent.

BROWN SPOT (*Physoderma zae-maydis*). Reported from Missouri (trace), Arkansas, Louisiana, Mississippi, Georgia, and Florida (4 per cent).

BACTERIAL WILT (*Aplanobacter stewarti*) established, in 1932, what was until then an all-time record for distribution and severity. The climatic

and biological conditions together combined to bring about a maximum of infection and damage. There was a like, if not a more favorable, combination of conditions in the crop season of 1933, with the result that, in comparison with 1932, there was more infection in Massachusetts, Connecticut, New Jersey, West Virginia, Arkansas, Illinois, and Missouri, and much more in New York. The disease also caused considerable losses in New Hampshire and in southern Maine, where it had never been known to occur previously. In Indiana and Ohio only was there less than in the previous year. Average percentage loss estimates were as follows: New York 10 to 12 per cent; Indiana, 10; Massachusetts 10; Iowa, 5; Missouri, 2; Arkansas and Maryland, trace. Maximum infections of 75 to 100 per cent were reported for occasional plantings of sweet corn in Maine, Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Illinois, and Indiana. The United States Department of Agriculture strains selected by Smith at Purdue were almost as susceptible in New York State as the more common strains during the seedling stage but gradually became more resistant, so that, by harvest time, the Golden Cross Bantam and other strains showed considerably more resistance than common strains. In Cayuga County, where flint corn is grown for seed, many fields showed from a trace to 10 per cent. In southern New York some early-planted fields of Golden Gem or other extra early yellow sweet corn were almost completely destroyed. Late planting helped reduce the percentage of injury.

S O R G H U M

HEAD SMUT (Sorosporium reilianum) was reported as having occurred in New Jersey and Wisconsin. Damage negligible.

KERNEL SMUT (Sphacelotheca spp.) Reported from Colorado (trace) and Kansas, where, in fields planted to nontreated seed, the infection ran from 5 to 25 per cent.

R I C E

STEM ROT (Leptosphaeria salvinii [Sclerotium oryzae]). Reported in Arkansas, Louisiana, Texas, and California.

LEAF SPOT (Ophiobolus Miyabeanus [Hemimyces oryzae]). Reported in Arkansas, Louisiana, and Texas.

SMUT (Tilletia horrida). Reported in Arkansas and Louisiana.

LEAF SMUT (Entyloma oryzae). Reported in Arkansas, Louisiana, and Texas.

LEAF SHEATH ROT (Ophiobolus oryzinus). Reported in Arkansas and Louisiana.

ROTTEN NECK (Piricularia grisea). Reported in Arkansas and Louisiana.

ROOT DISEASE - NEMATODE (Heterodera marioni). Reported in Arkansas.

Straighthead (Nonparasitic). Reported in Arkansas and Texas.

F L A X

WILT (*Fusarium lini*). Flax wilt was prevalent in Wisconsin, Minnesota, and North Dakota to approximately the same extent as last year. Losses were of no importance except in North Dakota, where there was an estimated yield depreciation of 1 per cent.

RUST (*Melampsora lini*) was reported as locally prevalent in Wisconsin, Minnesota, North Dakota, and Oregon. Of mild severity.

PASMO (*Phlyctaena linicola*). Wisconsin and Minnesota.

D I S E A S E S O F F O R A G E C R O P SA L F A L F A

DOWNTY MILDEW (*Feronospora trifoliorum*) was prevalent in Massachusetts, New Jersey, West Virginia, Washington, and Wisconsin. Of little importance in 1933.

BACTERIAL WILT (*Aplanobacter insidiosum*). Reports were received from only a few of the many States in which bacterial wilt is known to be important. Losses were estimated at 7 per cent in Massachusetts and 15 per cent in Oregon. C. W. Hungerford, reporting from Idaho, states: "Winter injury has also been very common with alfalfa and, as usual following a severe winter, we have had a considerable amount of injury from bacterial wilt. Wilt losses are limited largely to the areas along the Snake River Valley from Cassia County to the Oregon line." Certain Turkestan selections showed some resistance. In California, wilt continues as the most destructive alfalfa disease in the southern Sacramento Valley and in the valleys of the Antelope and Mojave Rivers. The disease is serious in eastern and central Oregon and is reported from southern Oregon. Minnesota and Wisconsin also reported occurrence of wilt.

LEAF SPOT (*Eseudopeziza medicaginis*) was reported from California, Connecticut, Michigan, Minnesota, Missouri (0.5 per cent loss), New Jersey, North Dakota, Pennsylvania, and Wisconsin. Damage in all but Missouri was a trace or less. Conditions were unfavorable because of dry weather.

STEM ROT (*Sclerotinia trifoliorum*). Stem rot occurred in West Virginia, Virginia, and Kentucky. It was notably less prevalent than last year. In West Virginia it was said to be most severe in fields on the best soils.

SOUTHERN BLIGHT (*Sclerotium rolfsii*). In Georgia.

ROOT ROT (*Phymatotrichum omnivorum*) caused 25 per cent reduction in yield in Texas.

ANTHRACNOSE (Colletotrichum destructivum). In Kentucky.

RUST (Uromyces medicaginis) was reported present in California, Texas, and New Jersey. Unimportant and of local occurrence.

BLACK STEM (Phoma medicaginis). Reported by Valleau as occurring in Kentucky where stands were much reduced soon after resumption of spring growth. This was particularly the case where heavy stands of alfalfa of the previous fall were left to serve as a winter cover.

YELLOW BLOTH (Pyrenopeziza medicaginis). Minnesota.

PLEOSPHAEERULINA DISEASE (Pleosphaerulina briosiana) caused almost complete killing of large areas in Tennessee. Other areas were defoliated.

YELLOWS (Leaf hopper, Empoasca fabae) was reported from New Jersey, West Virginia, Wisconsin, and California. In some New Jersey fields it was severe.

DWARF (cause unknown). J. L. Weimer reported that this disease is limited in distribution to southern California and the southern part of the San Joaquin Valley. Where it occurs it is equally as destructive as the bacterial wilt. As high as 60 per cent of natural infection was found in November in some plants transplanted to the field in rows in the spring. Five to 10 per cent infection in new stands is common. Many rows of alfalfa in plot experiments have 25 to 50 per cent of infected plants at the end of their second summer and some 3-year-old rows have only an occasional healthy plant left.

WITCHES' BROOM (? virus). Washington.

C L O V E R

POWDERY MILDEW (Erysiphe polygoni) was generally less prevalent than in 1932 and than in an average year. It was reported from Delaware, Connecticut, Tennessee, Wisconsin, Minnesota (the only State reporting more than last year), and Missouri. Losses were apparently inconsequential.

ANTHRACNOSE (Colletotrichum trifolii). Missouri. Average loss, a trace.

O'GARA'S ANTHRACNOSE (Colletotrichum destructivum). Kentucky. Valleau reported it to be rather common as a leaf spot. He had isolated the organism from sweet clover and red clover.

NORTHERN ANTHRACNOSE (Kabatiella caulivora) was much more prevalent in Delaware than in 1932 or in an average year. Reported also from Kentucky, where, according to Valleau, it caused death of leaves by attacking the petioles. Elsewhere, not observed.

STEM ROT (Sclerotinia trifoliorum). New Jersey and Kentucky. In the latter State, it was reported as very active on fall-sown red clover. Very abundant in fall of 1932; again, in January and February, 1933, and in April and May.

RUST (Uromyces spp.). Massachusetts, Connecticut, New Jersey, Minnesota. Of little importance.

BLACK STEM (Phoma sp.). Kentucky, where stands of red clover were completely destroyed in early spring. This is a major cause of failure of European red clovers in Kentucky. It attacks new leaves and petioles, destroying them almost as fast as they appear.

SOOTY SPOT (Phyllachora trifolii). New Jersey (little importance) and Missouri (trace).

LEAF SPOT (Pseudopeziza trifolii). New Jersey (severe in some fields) Tennessee, and Washington.

SEPTORIA LEAF SPOT (Septoria trifolii). New Jersey.

CERCOSPORA LEAF SPOT (Cercospora medicaginis). New Jersey.

SWEET CLOVER

BLACK STEM (Ascochyta lethalis). Reported only from Kentucky, where it appeared as a severe leaf spot, frequently destroying all foliage and so attacking young shoots that the plants died. Particularly bad in heavy stands.

ANTHRACNOSE (Colletotrichum destructivum). Kentucky.

STRING DYING (Pythium-like fungus). Kentucky. In this and neighboring States to the north according to Valleau, sweet clover has gone into the winter in good condition but, shortly after resumption of spring growth, the stands have rather quickly disappeared. Infection apparently occurs at the ground line, in the tap root of slightly heaved plants, and sometimes in new shoots. A Pythium-like fungus was isolated and its pathogenicity was proved. Specimens from Ohio and Illinois yielded the same fungus. Apparently widespread and may cause extensive damage.

ROOT ROT (Undetermined). Illinois, important in southern part of State. Also reported from Minnesota. Identity of this and the Illinois disease not yet established.

COWPEA

WILT (Fusarium vasinfectum tracheiphilum) was reported as here-and-there prevalent in Missouri, confined mostly to southeastern Missouri lowlands. Observed also near Athens, Georgia, and in Coastal plain counties of North Carolina, where it is yearly very important.

DRY ROOT ROT (Fusarium martii phaseoli). Mississippi.

ROOT KNOT (Heterodera marioni). Locally prevalent in Missouri and North Carolina. In Georgia, it caused an average loss of 0.3 per cent; confined largely to lowlands of southeastern part of State. In North Carolina most commonly observed in Coastal Plain area.

DOWNTY MILDEW (Erysiphe polygoni). Very serious in both northern and southern Georgia, where it caused much late defoliation.

RHIZOCTONOSIS (Rhizoctonia sp.). Louisiana.

CERCOSPORE LEAF SPOT (Cercospora sp.). New Jersey.

MOSAIC (Virus). Palermo, New Jersey. Almost 100 per cent infection.

S O Y B E A N S

SOUTHERN BLIGHT (Sclerotium rolfsii). Locally serious in Georgia; here-and-there prevalent in Mississippi.

BACTERIAL SPOT (Bacterium phaseoli sojense) was generally prevalent in Delaware.

CERCOSPORE LEAF SPOT (Cercospora cruenta). Locally prevalent in Mississippi.

SEPTORIA LEAF SPOT (Septoria glycines). Generally prevalent in Delaware.

ROOT KNOT (Heterodera marioni). North Carolina.

ASHY STEM BLIGHT (Macrophomina phaseoli). Locally prevalent in North Carolina.

MOSAIC (Virus). New Jersey.

L E S P E D E Z A

RUST (Uromyces lespedezae -procumbentis). Alabama.

ROOT KNOT (Heterodera marioni). Maryland.

STEM ROT (Sclerotium rolfsii) on Korean Lespedeza, L. stipulacea, in North Carolina.

M E D I C A G O L U P U L I N A

RUST (Uromyces striatus). Alabama.

A U S T R I A N W I N T E R P E A

LEAF SPOT (Ascochyta pisi). Georgia. This disease caused marked defoliation during maturation of the seed.

S U N F L O W E R

RUST (Puccinia helianthi). Wisconsin. Too late to cause much damage.

MILDEW (Erysiphe cichoracearum). Wisconsin. Generally prevalent.

LEAF NEMATODE (Anguillulina balsamophila). Washington; collected and identified by W. D. Courtney. First recorded occurrence on sunflower.

G R A S S E S

SMUTS. Ustilago striaeformis on Lolium perenne. Oregon.

U. cynodontis on Bermuda grass, Capriola dactylon. Arizona.

U. rabenhorstiana on crab grass, Syntherisma sanguinalis, in Georgia, where this grass is cut for hay. Several fields near Athens badly smutted.

U. bromivora on Agropyron sp. Washington (State).

U. hypodytes on Quincy grass. Winchester, Washington.

RUSTS. Puccinia coronata on Lolium perenne. Alabama; hitherto unreported.

Uromyces hordeinus on Hordeum pusillum. Alabama.

U. halstedii on Homalocenchrus virginicus. Alabama.

P. purpurea on Holcus halepensis. Alabama.

U. eragrostidis on Eragrostis capillaris. Alabama; hitherto unreported.

U. spermatozoides on Diadisia teres. Alabama; hitherto unreported.

P. andropogii on Andropogon scoparius. Alabama.

P. graminis agrostidis on Agrostis alba. Connecticut.

SEPTORIOSES. Undetermined species of Septoria were said to be of some importance in Oregon on Poa pratensis, Bromus marginatus, B. hordeaceus, and B. commutatus; and were also reported on Agrostis maritimus, Notholcus lanatus, Poa compressa, Poa sandbergii, and Sitanion hystrix.

CERCOSPORELLA FOOT ROT (Cercospora herpotrichoides) occurred in Washington on Koeleria cristata, Bromus tectorum, Agropyron riparium, and A. inerme.

HELMINTHOSPORIUM LEAF SPOT (Helminthosporium sp.) on blue grass in Kentucky (caused extensive yellowing of the grass).

HELMINTHOSPORIOSIS (Helminthosporium triseptatum) on Notholcus lanatus. Oregon. Weakly parasitic on dying leaves of the grass growing in acid soil. Locally very abundant.

NEMATODE (Anguillulina graminophila) on Agrostis tenuis. Oregon. Bent grass heavily infested near Corvallis.

SCOLECOTRICHUM DISEASE (Sccoleotrichum graminis) on Fhleum pratense. Oregon. Present on many species of grasses. The severe freeze of February predisposed surviving plants to this fungus.

ENLARGED HEADS (Pediculopsis graminum plus undetermined fungus) on Agropyron spp. in Washington.

HETEROSPORIUM LEAF SPOT (Heterosporium phlei) on Timothy, Fhleum pratense. In Washington; hitherto unreported.

DISEASES OF FRUIT AND NUT CROPS

APPLE

SCAB (Venturia inaequalis) was reported from 27 States in 5 of which it was more prevalent than in 1932 and in 5 others it was much more prevalent. In but 3 - Iowa, Kansas, and Montana - was it less prevalent. Eleven reported it more to much more prevalent than in an average year. Those States reporting losses of 5 per cent or greater were: Indiana, 50; Illinois, 40; Virginia, 25; Michigan, 25; Maryland, 15; Ohio, 12; Wisconsin, 12; and Massachusetts, 5. Ascospore discharge was early in those States where heaviest infection was experienced: West Virginia, April 11; Delaware, April 4; Michigan, April 17. Spring rains and mild temperature favored early and widespread infection.

BLOTH (Phyllosticta solitaria) was reported to be present in Maine, New Jersey, Delaware, Maryland, Virginia, Kentucky, Mississippi, Arkansas, Ohio, Illinois, Indiana, Wisconsin, Missouri, and Kansas. It was much more prevalent in Delaware than last year or than in an average year. Average losses ranged from a trace in Virginia to 3 per cent in Missouri and Illinois but attained no commercial importance in properly sprayed orchards.

RUST (Gymnosporangium spp.) was reported widely prevalent in Connecticut favored by early wet spring. It ceased to be important to the average orchardist of northern Virginia and northeastern Kansas with elimination of cedars near orchards. Elsewhere in Virginia, many orchards were more seriously rusted than usual. Average losses ranged from a trace in Minnesota and Iowa to 8 per cent in Virginia and 5 in Massachusetts and 1 per cent in Indiana and Missouri, with a maximum loss in individual orchards amounting to 40 to 44 per cent in Massachusetts and Virginia. In Virginia and Indiana, quince rust (G. germinale) was observed on apple. The hawthorn rust (G. globosum) was reported from Connecticut.

BLACK ROT (Physalospora obtusa [Sphaeropsis malorum]) was more prevalent than last year in Massachusetts, Connecticut, Virginia, and Missouri. Elsewhere, there was the usual prevalence or less. Average losses were recorded as follows: Ohio, 3 per cent; Maryland, 2.5; Virginia, 2; Missouri, 1.5; Massachusetts, 1; Indiana, 0.5; elsewhere, a trace or less.

BLIGHT (Bacillus amylovorus) was reported as more or less prevalent in 26 States. In 6, it was more widespread and severe than in 1932, while in 9 it was less so. In New York, where it was severe to slight in 50 counties, many orchards suffered an almost total blossom blight, followed by profuse twig blight and a consequent loss of crop for the season and of fruit spurs for following crop seasons. In Massachusetts, more blossom blight was observed than in any other season. Average percentage losses were reported as follows: Wisconsin, 5; Missouri, 3; Massachusetts, 2; Virginia, 1.5; North Dakota, 1.5; Iowa, 1; Maryland, 1; Ohio, 0.5; elsewhere a trace or less. Maximum losses of 20, 20, 35, and 50 per cent were reported for individual orchards in Massachusetts, North Carolina, Missouri, and Minnesota, respectively.

CROWN GALL (Bacterium tumefaciens) was reported from New Jersey, Maryland, Mississippi, Wisconsin, Missouri, and Kansas.

POWDERY MILDEW (Podosphaera leucotricha) was scatteringly present in New York, New Jersey, Virginia, Georgia, and Washington. In Georgia, certain varieties, especially Rome Beauty, were so severely attacked as to cause death of fruit spurs and tips of young twigs.

FRUIT SPOT (Mycosphaerella pomi). Reported more or less prevalent in Maine, Massachusetts, New Jersey, Maryland, Kentucky, Arkansas, and Ohio and generally prevalent in Delaware, where the varieties Grimes Golden, Stayman Winesap, Jonathan, and Paragon were affected.

BITTER PIT (Undetermined) was reported more to much more prevalent than usual in New Hampshire, Delaware, Virginia, West Virginia, North Carolina, and Wisconsin. Groves wrote that bitter pit appeared rather late in Virginia, but losses due to it were more severe in some orchards than from any other disease. He estimated an average loss of 2 per cent for the State. In North Carolina, according to Foole, bitter pit was especially severe in areas where the drought was most pronounced and where the trees

bore heavily. Vaughan in Wisconsin stated that more specimens had been received than for several years, due apparently to irregular rainfall and low soil moisture. On the other hand, bitter pit was said not to be serious in western New York in 1933, and less than usual was reported in Maryland.

SOOTY BLOTH (Gloeodes pomigena). Sooty blotch was generally prevalent in Delaware, Maryland, and Mississippi and locally to scatteringly so in New Jersey and Connecticut. In New Jersey, it was "very severe" on Winesaps.

FLY SPECK (Leptothyrium pomi). Maryland, North Carolina, Wisconsin, and Mississippi. Caused very little damage.

BLISTER SPOT (Bacterium papulans). A mild outbreak of this obscure disease was observed during the week of July 29, 1933, on well sprayed Stayman Winesap trees at the University of Arkansas Farm, Fayetteville, Arkansas. The infections were more numerous on the south side of the tree. Occasional specimens were observed in various commercial orchards in 1931. The disease was not observed in 1932 and the 1933 outbreak was the first observed where more than an occasional apple was found to be infected. (John C. Dunegan).

CANKER (Myxosporium corticolum) is usually not injurious, but in New Jersey it was said to be severe on Rome Beauty, Missouri Pippin, Gravenstein, Duchess, Transparent, McIntosh, and Twenty Ounce, in 1933.

BLISTER CANKER (Nummularia discreta). Incidence of this canker was reported from Virginia, Arkansas, Missouri, and Kansas.

PERENNIAL CANKER (Gloeosporium perennans) Oregon, confined mostly to the Hood River Valley. According to LeRoy Childs, the parasite of the wooly aphid is now well established and appears to be assisting in the control of the wooly aphid which is associated with perennial canker infection, so that there has been no serious spread of the canker since the parasite was introduced in 1928. The fruit rot was reported from Washington.

XYLARIA ROOT ROT (Xylaria sp.) Virginia and Tennessee.

WOOD ROT (Fleurotus ulmarius). One report in Connecticut, on a living tree.

SPRAY INJURY was reported as of frequent occurrence in New York, New Jersey, Delaware, Virginia, Illinois, and Arkansas. In Illinois, it was much more prevalent than last year or than in an average year and was attributed in most instances to lime-sulphur (1-50). Spray injury was reported from several counties in New York and from 2 counties in New Jersey. In Washington, arsenical injury of fruit was reported from the Wenatchee and White Salmon districts, and sulphur sunscald from Yakima and Wenatchee.

P E A R

SCAB (Venturia pyrina). Several severe local infections were reported from Maine. It was observed in 5 counties in New York and in New Jersey, Maryland, Virginia, Ohio, Michigan, Wisconsin, Missouri, Kansas, Washington, and Oregon. Estimated losses were: Maryland, Ohio, Michigan, 5 per cent; Missouri, 2 per cent.

BLIGHT (Bacillus amylovorus) was reported from 17 States. In Massachusetts, Connecticut, Michigan, and Wisconsin, it was more prevalent than in 1932. It was less so in Virginia, Missouri, and Kansas, and much less so in Arkansas. Estimated percentage losses ran as follows: Massachusetts, 15; Virginia, 10; Maryland, 7; Missouri, 4; and Ohio, 0.5. In New York, the principal varieties noted in the order of severity of injury were Clapp Favorite, Bartlett, Bosc, Seckel, and Kieffer.

LEAF BLIGHT (Fabraea maculata). Reported from Delaware as much more prevalent than in 1932. Reported also prevalent in New Jersey, Maryland, Virginia, Tennessee, Louisiana, and Missouri.

RUST (Gymnosporangium juniperi-virginianae). New York.

MYCOSPHAERELLA LEAF SPOT (Mycosphaerella sentina). New York and Mississippi.

BLACK ROT (Physalospora obtusa [Sphaeropsis malorum]). New Jersey.

CROWN GALL (Bacterium tumefaciens). Washington.

BOTRYTIS ROT (Botrytis cinerea). Washington.

CERCOSPORE LEAF SPOT (Cercospora minima). Louisiana.

BROWN ROT CANKER (Sclerotinia cinerea f. rma pruni). Washington.

Q U I N C E

RUST (Gymnosporangium germinale). Massachusetts (trace to 5 per cent) and Michigan (trace).

BLIGHT (Bacillus amylovorus). Much more prevalent in Massachusetts than in 1932; also reported from Connecticut, New York, New Jersey. Estimated loss in Massachusetts, 20 per cent, with a maximum of 50, attributed largely to the fact that blighted branches were not removed in 1932.

LEAF SPOT (Fabraea maculata). Unusually prevalent in Delaware. Reported also from Louisiana, Tennessee, New York.

BLACK ROT (Physalospora obtusa [Sphaeropsis malorum]). Massachusetts.

CROWN GALL (Bacterium tumefaciens). New Jersey.

P E A C H

LEAF CURL (*Exoascus deformans*) was more prevalent than in 1932 in Connecticut, Maryland, Virginia, West Virginia, Mississippi, Arkansas, Michigan, Missouri, and Kansas and much more so in Delaware, Ohio, Illinois, Indiana, and California. In many of these States the attack of leaf curl was said to be more severe than for 10 or 15 years, and in Ohio and Illinois, it was reported as the worst ever experienced. Percentage losses were reported as follows: Ohio, 10; Illinois, 10; Indiana, 8; Missouri, 8; and Maryland, 2.5. Individual maximum losses of 90 per cent or more were recorded in West Virginia, Tennessee, and Missouri. Properly sprayed orchards were very generally free of curl. Many growers, because of unusual economic conditions, could not spray; hence the unusually wide and severe incidence of leaf curl.

BROWN ROT (*Sclerotinia fructicola*). This disease was widespread and more prevalent than last year in New Hampshire, New York, Massachusetts, Connecticut, and Kentucky and much more prevalent in Delaware, Maryland, and Indiana. It was less so in North Carolina, Georgia, Ohio, Michigan, and Kansas and much less so in Illinois. Average percentage losses ranged from 10 per cent in Massachusetts, 7 per cent in Maryland, 4 in Indiana, and 1.5 in Missouri, to a trace in Illinois and Michigan. There was considerable blossom blight in the West End of the peach belt in New York and heavy loss of fruit during the packing season.

BACTERIAL SPOT (*Bacterium pruni*). Incidence of this disease was recorded in Massachusetts, Connecticut, New Jersey, Delaware, Maryland, Virginia, North Carolina, Georgia, Arkansas, Ohio, Illinois, Missouri, Kansas, and Arizona. Average losses ranged from a trace to 2 per cent. Individual cases of as much as 15 per cent loss were reported from Missouri. In Massachusetts, Connecticut, and Delaware, the prevalence was greater than in 1932 and much premature leaf fall was recorded in many States.

SCAB (*Cladosporium carpophilum*) was more prevalent in Indiana and much more so in Delaware than it was in 1932 or than in an average year. In New Hampshire, Maryland, Mississippi, and Ohio, it was approximately the same as in 1932, while in Kentucky, Missouri, and Kansas it was less prevalent. In most instances, the damage recorded was of negligible importance. Average percentage losses of any significance were Maryland and Indiana, 2; Ohio, 1; and Missouri, 0.5.

CROWN GALL (*Bacterium tumefaciens*) was reported from Connecticut, Missouri (mostly confined to nursery stock), and North Carolina, where it was widely distributed in the sand-hill area. It was present in both low and high land but most severe in the former. Infected trees in many orchards died after the March freeze.

BLIGHT (*Coryneum beijerinckii*). Maryland, Michigan, Missouri. Average loss did not exceed a trace.

YELLOWS (Virus) was reported from New Hampshire, New Jersey, Pennsylvania, Maryland, Virginia, Kentucky, Tennessee, Missouri, and District of Columbia. In Pennsylvania, 428,756 trees in 13 counties were inspected. Approximately 0.14 per cent of these were found affected with yellows. Valleau of Kentucky reports that in a clean cultivated part of an orchard in Oldham County 18 "yellows" trees were removed. In another part of the same orchard, 300 yards away from those trees there was one affected tree, with weeds abundant and tall. The spread of yellows suggested to him that, if the insect vector is limited to peach trees, the disease will extend more rapidly than where woods or a cover crop is present.

POWDERY MILDEW (*Podosphaera oxyacanthae*). New Jersey and Utah.

DIE BACK (*Valsa leucostoma*). Tennessee, Michigan, and Missouri. Serious in neglected orchards, causing as much as 30 per cent loss in some Missouri orchards.

TWIG BLIGHT (*Shaeropsis malorum*). Texas.

RUST (*Tranzschelia pruni-spinosae* [*T. punctata*]). Missouri.

SHOT HOLE (*Cercospora circumscissa*). Mississippi.

ROOT KNOT (*Heterodera marioni*). North Carolina, Missouri, and Arizona. In North Carolina, according to Poole, young trees on infested soil died in large numbers. Other affected trees died following the spring freeze. Trees on badly infested soils showed lack of vigor toward the end of the growing season. Brown reported that root knot is a serious disease in Arizona. The stunted fruit from infected trees cannot compete in the market with imported fruit.

SPRAY INJURY. Reports of spray injury were received from Connecticut, New York, New Jersey, Delaware, Maryland, and Virginia. Cases of severe arsenical injury were observed in New York just prior to blooming, a most unusual circumstance. Frost injured the early blossom-bud leaves, and unseasonably hot weather prevailed during the delayed dormancy period. As a result, severe leaf injury resulted from lime-sulphur in the delayed dormant spray. No such injury followed use of wettable sulphur sprays. In Virginia, the general acceptance of zinc lime as an arsenical corrective apparently resulted in much less spray injury than was experienced when the combination was not applied.

WINTER INJURY was reported from Delaware, Virginia (Amherst County), Mississippi (Attala County), Arkansas, Michigan, Washington, and Oregon.

PLUM AND PRUNE

BROWN ROT (Sclerotinia fructicola). This disease was reported present in varying degrees of severity in 12 States. In New Jersey, it caused marked damage in plantings of Green Gage plums, and, according to A. B. Groves, of Virginia, home plantings of plums in that State were, in many cases, a total loss. Average percentage losses, as reported, were Ohio and Michigan, each 10; Maryland, 7; and Missouri, 5. Individual maximum losses ran from 30 to 100 per cent. Sclerotinia cinerea forma pruni was reported from Washington.

CROWN GALL (Bacterium tumefaciens). Maryland, Minnesota.

BACTERIAL SPOT (Bacterium pruni). No appreciable damage was reported as having been caused by bacterial spot. Its incidence was recorded in Maine, Maryland, Virginia, Ohio, and Wisconsin.

PLUM POCKET (Exopascus communis) was more prevalent than in 1932 in Mississippi and much more prevalent in Wisconsin. Elsewhere (Tennessee, Michigan, Minnesota, and North Dakota), it was the same as last year. The average percentage losses were Wisconsin, 5; North Dakota, 2; and Missouri, 0.1. In Mississippi, it was observed in 16 counties.

BLACK KNOT (Plowrightia morbosa). Massachusetts, Connecticut, New Jersey, Maryland, Michigan, Wisconsin, Minnesota, Missouri, and North Dakota. Of little economic importance in commercial plantings.

SHOT HOLE (Coccomyces prunophorae). Slight to moderately severe in New York; of more than average destructiveness in Oregon. Incidence reported also from Minnesota and Kansas.

SCAB (Cladosporium carpophilum). Arkansas, Wisconsin.

BLIGHT (Bacillus amylovorus). Mississippi.

C H E R R Y

LEAF SPOT (Coccomyces hiemalis) was more prevalent in Michigan and Missouri than it was last year and much more so in Delaware. New York reported moderate to severe infection of both sour and sweet varieties. Very prevalent annually in Tennessee. In Arkansas, neglected orchards showed as much as 50 per cent defoliation. Properly sprayed orchards were healthy. Losses in Michigan, Wisconsin, and Missouri, severe. Exceeded average destructiveness in Oregon.

BROWN ROT (Sclerotinia fructicola). Delaware and Maryland reported brown rot much more prevalent than in 1932 and than in an average year. It was less prevalent in Michigan, Wisconsin, and Oregon and much less so in Kansas. In Maryland, where the disease was favored by heavy summer rains,

the estimated average loss was 5 per cent. In Virginia, the sweet cherry was severely affected, in some instances amounting to a total loss.
Sclerotinia cinerea forma pruni, Washington.

BACTERIAL SPOT (Bacterium pruni). New York, and Iowa.

CALIFORNIA BLIGHT (Coryneum beijerinckii). Washington.

WITCHES' BROOM (Exoascus cerasi). Washington.

XYLARIA ROOT ROT (Xylaria sp.). Tennessee. On trees used to replace apple trees that had died of this disease.

ARMILLARIA ROOT ROT (Armillaria mellea). Michigan. Locally severe.

BLACK KNOT (Plowrightia morbosa) New Jersey. General but not serious.

BLIGHT (Bacillus amylovorus). New Jersey.

G R A P E

BLACK ROT (Guignardia bidwellii) was reported as of more or less importance in 19 States in 5 of which it was more prevalent than in 1932. In Delaware, it was much more so. In Georgia, Illinois, and Kansas, it was less prevalent. Average percentage losses were Massachusetts and Florida, 15; Maryland, 6; Ohio, 4; and Missouri, 1.5. Individual maximum losses ranged from 10 to 100 per cent.

DOWNTY MILDEW (Plasmopara viticola). More prevalent than usual in New Jersey, Pennsylvania, Maryland, and Missouri. Less prevalent in Massachusetts, Florida, and Ohio and much less so in Illinois. Percentage losses on the whole, were small. Missouri, 2; Massachusetts, Pennsylvania, and Florida, 1 each; and Ohio, 0.5. The greatest maximum infection (55 per cent) was recorded in Missouri. In New Jersey, it was more serious than in many years. Could be found present on nearly every non-sprayed vine.

POWDERY MILDEW (Uncinula necator). Connecticut, New York, and Washington. Unimportant.

ANTHRACNOSE (Elsinoe ampelina / Sphaceloma ampelinum). Maryland, Florida, Arkansas. Serious in Florida, causing average loss of 25 per cent. Maryland, a trace.

DEAD ARM (Cryptosporrella viticola). New York and Michigan. Severe in yards where spraying has been neglected.

RIPE ROT (Glomerella cingulata). Maine, Massachusetts, Missouri.

CROWN GALL (Bacterium tumefaciens). Maryland (trace).

VIBRISSEA ROOT ROT (Vibrissea hypogaea). Iowa. Observed for first time in State, in Polk County.

S T R A W B E R R Y

LEAF SCORCH (Diplocarpon earlianum). Reported prevalent in Connecticut, Florida, Mississippi, Louisiana, Arkansas, and Wisconsin. Unimportant in comparison with last year.

LEAF SPOT (Mycosphaerella fragariae) was reported as generally prevalent in Mississippi, Louisiana, Michigan, Wisconsin, Minnesota, and Missouri. It was reported as much more prevalent in Illinois. Losses, except in individual cases, were generally unimportant.

DWARF (Aphelenchoides fragariae). Prevalent in Massachusetts, Virginia, Florida, Louisiana, and Arkansas. In Virginia, the average loss was 5 per cent, with a maximum of 75 per cent in individual instances. In Louisiana, it was observed that affected plants recover almost completely during the winter. Yield is, therefore, only slightly impaired.

BLACK ROOT (Undetermined). Reported prevalent in 15 States throughout the Nation, caused average percentage losses from a mere trace to 50. The most widespread and damaging disease in Massachusetts. Reported from Arizona as one of the most serious strawberry maladies in that State. In Michigan, it was severe but damage was difficult to estimate. Maryland reported recurrence of black rot in increasing amounts during the past 2 or 3 years. It is now the most serious strawberry problem in that State. In the severest cases, as many as 50 per cent of plants are killed.

BOTRYTIS FRUIT ROT (Botrytis cinerea). Reported from Louisiana as much more prevalent than in 1932 or in an average year. Estimated loss, 0 per cent. Reported generally prevalent in Pennsylvania and of little importance in Massachusetts because of dry weather.

LEATHER ROT (Phytophthora cactorum). Mississippi, Louisiana.

SOFT ROT (Rhizopus nigricans). Kansas, Arizona. Unimportant.

ROOT KNOT (Heterodera marioni) was reported from Maine, Massachusetts, Arkansas, and Missouri. Caused little more than a trace of loss.

LEAF VARIEGATION (Undetermined). Reported from Maryland, Virginia, Louisiana, Oklahoma, Arkansas. Confined to Blakemore variety.

POWDERY MILDEW (Sphaerotheca humuli). Washington.

MOSAIC (Virus). Wisconsin. Observed only in Douglas and Bayfield Counties.

SCLEROTIUM DISEASE (Sclerotium rolfsii). Florida. Less widespread but more destructive in individual fields than in former years.

YELLOW (Undetermined). Minnesota and Montana.

E L A C K B E R R Y

ORANGE RUST (Gymnoconia peckiana) was reported from New Jersey, Tennessee, Arkansas, Ohio, Wisconsin, Missouri, and Kansas as of minor importance, except in Arkansas, where it is regarded as the most important disease of the blackberry.

ANTHRACNOSE (Elsinoe veneta) caused an average loss of 5 per cent in Massachusetts. Severe also in New Jersey.

CANE BLIGHT (Leptosphaeria coniothyrium). Louisiana.

CROWN GALL (Bacterium tumefaciens). Wisconsin.

DOUBLE BLOSSOM (Fusisporium rubi). West Virginia. Some plantings a total crop loss.

MOSAIC. New Jersey.

LEAF SPOT (Mycosphaerella rubi). Kansas and New Jersey.

GRAY MOLD (Botrytis cinerea). New Jersey.

R A S F B E R R Y

ANTHRACNOSE (Elsinoe veneta) was more prevalent than in 1932 in New Jersey, Illinois, Michigan, and Wisconsin. In Arkansas, it is always present and important. Estimated percentage losses were as follows: Maryland and Illinois, 5 each; Missouri, 4; Kansas, 2; Massachusetts, 1. Wisconsin reported considerable damage in the case of red varieties, particularly when subjected to overhead irrigation.

LEAF SPOT (Mycosphaerella rubi) was reported from New Jersey, Kentucky, Illinois, and Oregon. In New Jersey, the varieties Latham, Chief, and Viking were the most susceptible. Slight infection in Miller and none in the variety Potomac. In Kentucky, the disease was very severe, causing marked defoliation in the fall of 1932, and a high percentage (25 to 95 per cent) mortality during the winter. The varieties Chief and Latham were highly susceptible to such injury.

SPUR BLIGHT (Mycosphaerella rubina). Spur blight caused a loss of 5 per cent in Massachusetts. It was reported also from New York, Kentucky, and Wisconsin.

LEPTOSPHAERIA CANE BLIGHT (Leptosphaeria coniothyrium). Reported from Massachusetts, Maryland, Virginia, Kentucky, Ohio, Missouri, and Kansas. Percentage losses ranged from 50 in Kentucky to 4 in Maryland, 3 in Massachusetts, and 1 in Ohio.

CROWN GALL (Bacterium tumefaciens). Maryland, Mississippi, Ohio, Michigan, Minnesota, and Kansas. Very severe near Hopkins, Minnesota, an important raspberry district. Average loss in any State did not exceed 2 per cent.

ORANGE RUST (Gymnoconia peckiana). Much more prevalent than usual in Massachusetts, where losses in occasional plantings ran as high as 10 to 75 per cent. Reported also from Maryland, Arkansas, Michigan, Minnesota, and Wisconsin.

LEAF CURL (Virus). Maryland, Ohio, and Wisconsin.

MOSAIC (Virus). Reported more or less generally prevalent in 13 States. Estimated damage in Massachusetts, 20 per cent; Ohio, 8; North Dakota, 1. In most States, of little economic importance.

STREAK (Virus), according to H. C. Young, caused a 4 per cent loss to growers in Ohio.

WILT (Verticillium sp.). Massachusetts and Michigan, trace.

POWDERY MILDEW (Sphaerotheca humuli) was reported as of scattered occurrence in New York and Minnesota. Not important.

LATE RUST (Pucciniastrum americanum). Massachusetts. Illinois and Indiana.

ORANGE RUST (Gymnoconia peckiana). Virginia.

WESTERN RUST (Phragmidium rubi-idaei [P. imitans]). Washington, Oregon. Important.

WINTER INJURY. Kentucky, Ohio, Minnesota, Arkansas, and Washington.

C R A N B E R R Y

FALSE BLOSSOM (Virus). Massachusetts, Wisconsin. Moderately important. Appeared early in Wisconsin.

BITTER ROT (Glomerella cingulata vaccinii). Massachusetts. Apparently was present in all bogs; locally, very destructive, causing 50 to 75 per cent loss in individual bogs.

ROSE BLOOM (Exobasidium vaccinii). Massachusetts. Locally prevalent.

B L U E B E R R Y

STEM BLIGHT (Alternaria sp.?). Massachusetts. Was prevalent in all plantings but only locally serious. Caused serious damage in a few instances.

CROWN GALL (Bacterium tumefaciens). Massachusetts. Prevalent locally; becoming important in a few plantings.

WITCHES' BROOM (Pucciniastrum goeppertianum). New Hampshire.

LEAF SPOT (DIEBACK) (Fungus origin). Ohio. Important.

G O O S E B E R R Y

RUST (Puccinia caricis). New York, Wisconsin. Unimportant.

ANTHRACNOSE (Pseudopeziza ribis). New Jersey, Wisconsin.

POWDERY MILDEW (Sphaerotheca mors-uvae). Wisconsin, Washington.

LEAF SPOT (Mycosphaerella grossulariae). Wisconsin, Kansas.

C U R R A N T

RUST (Puccinia caricis). Connecticut.

ANTHRACNOSE (Pseudopeziza ribis). New Jersey. Local and severe.

ROOT ROT (Fomes ribis). Michigan.

C I T R U S

STEM-END ROT, MELANOSE (Diaporthe citri [Phomopsis citri, F. californica]) was important in Florida, as usual. Abundant spring rains favored earlier fruit infection than usually occurs, and leaf infection was severe and common throughout the summer. Nevertheless, Florida citrus fruits were of better quality, size, and maturity than in the preceding year, according to Kuntz. Reductions in yield were estimated at 4 per cent for grapefruit, 3 per cent for sweet oranges, and 2 per cent for tangerines, while the losses from fruit rot were 4, 3, and 2 per cent, respectively. The disease was reported on Satsuma orange in Mississippi. Melanose and stem-end-rot are not important commercially in California, but lemon trees there are subject to decorticosis or shell-bark caused by this organism (at first called Phomopsis californica, now considered to be the same as F. citri). Other citrus trees are resistant to or immune from this form of attack.

CANKER (Bacterium citri) was reported from a 15-mile area in Harris, Brazoria, and Galveston Counties, Texas, where these counties join. Scattered, abandoned thickets of Citrus trifoliata serve as infection loci in that area.

SCAB (Sphaceloma fawcettii) occurred on lime, grapefruit, King orange, and lemon in Florida. On grapefruit, which is the most important host, the loss was 5 per cent. Both foliage and young fruit of grapefruit were affected, but only fruit of the other hosts. Also reported from southern Louisiana on orange and from Mississippi on Satsuma.

BLAST AND BLACKPIT (Bacterium syringae [B. citriputeale]). Very little black pit, which affects lemons especially, was noted in California, due to the lack of hail accompanying rains. The usual amount of blast occurred.

ANTHRACNOSE ROT AND WITHERTIP (Colletotrichum gloeosporioides). California.

BROWN ROT, BROWN ROT GUMMOSIS (Phytophthora spp.) are diseases of major importance in California. Brown rot of the fruit due to Phytophthora citrophthora, P. parasitica, and P. hibernalis was of the usual prevalence in 1933. There was an increased amount of gummosis caused by P. citrophthora and P. parasitica. Sour orange is very resistant to this gummosis, grapefruit, sweet orange, and tangerine are susceptible, and lemon very susceptible. Gummosis and fruit rot due to P. citrophthora were reported from the western part of Puerto Rico but were not important there.

GUMMOSIS (Botrytis cinerea) occurs near the coast of California on lemons but is usually of slight importance. In 1933 there was less than usual.

STEM-END ROT, GUMMOSIS (Diplodia natalensis = Physalospora rhodina). Considerable stem-end rot occurred in Florida groves in the fall, especially in the storm areas. Diplodia-gummosis was much less prevalent than usual in California. Orange is resistant to this gummosis, lemon and grapefruit are susceptible.

ROOT ROT (Armillaria mellea) occurs locally in California. Probably all the common root stocks are susceptible.

FRUIT ROTS AND INJURIES. According to H. E. Stevens, considerable stem-end rot due largely to Diplodia, Phomopsis, and Penicillium developed in Florida groves in the fall, especially in the storm areas. Most of this was due largely to previous injury or scratches on the fruit occasioned by the storms. Outside of this area there was no decided increase in fruit loss from stem-end rot.

Fruit rots and injuries reported from California by H. S. Fawcett include: Alternaria rot of lemons and black rot of oranges (Alternaria citri), the former less prevalent than usual, the latter of average abundance. Rot caused by Fusarium spp., of slight importance. Sour rot

(Oospora citri-aurantii), less prevalent than usual due to a season below average in temperature. Green mold and blue contact mold (Penicillium digitatum and P. italicum) were both very important, as usual. Stylar-end rot of Persian limes (undet.) Endoxerosis or internal decline of lemons (? water relations) was less abundant than usual due to cooler summer. Juice sac granulation of Valencia oranges appears to be associated with vigorous growth and was more prevalent than usual. Oleocellosis (oil liberated from rind) less abundant than usual, affects all citrus but especially lemons. Red blotch, possibly due to respiration products, a storage problem especially of lemons. Peteca, also on lemons, mostly in storage. Water spot and rot (water absorbed by rind) occurs mostly in the eastern end of Los Angeles County and affects Navel oranges especially but other kinds if conditions favor it. In 1933, the weather at first was favorable but later became drier, and development of this trouble was checked.

LEAF SPOTS. Phyllosticta sp. was reported on lemon from New Jersey. Septoria citri is of slight importance in Riverside and San Bernardino Counties, California. There was less than usual in 1933 and much less than in the preceding year, due to the dry summer. Grapefruit and lemon are susceptible, orange is resistant.

TWIG BLIGHT (Sclerotinia sclerotiorum). California, especially on lemons. Less than usual.

PSOROSIS (probably virus) is a very important disease in California. In 1933 it was more prevalent than usual.

CHLOROSIS, EXANTHEMA, MOTTLE LEAF (malnutrition) were reported from California. Mottle leaf is most important.

A V O C A D O

ANTHRACNOSE (Colletotrichum gloeosporioides). In southern Florida and Puerto Rico.

SCAB (Sphaceloma perseae) was very severe in several parts of Florida causing a high percentage of inferior fruit where no control was attempted. Also in Puerto Rico.

FRUIT AND LEAF SPOT (Cercospora sp.) appeared to be more severe in Florida especially on foliage, than previously. In some cases 90 per cent of the fruit was made unsalable through surface spots. This condition applied more to individual trees or to certain groves where no efforts were made to control the disease. (H. E. Stevens).

POWDERY MILDEW (Oidium sp.). Southern Florida.

ALGAL LEAF SPOT (Cephaleuros virescens). Florida.

B A N A N A

PANAMA DISEASE (Fusarium cubense). Always present but not abundant in Puerto Rico.

STEM AND LEAF ROT (Sclerotium rolfsii) also reported from Puerto Rico (Insular Experiment Station).

F I G.

RUST (Physopella fici). Georgia. All figs near Athens were infected but incidence too late to do much damage. Reported also from Alabama and Florida.

TWIG BLIGHT (Stilbum cinnabarinum). Reported from Louisiana. First appeared there in 1932, apparently confined to very moist, shady places.

THREAD BLIGHT (Corticium koleroga) is very destructive in southwestern Louisiana.

CANKER (Tubercularia fici). Louisiana.

ROOT KNOT (Heterodera marioni) is a serious trouble in Arizona and is becoming more extensively distributed through sale of diseased nursery stock.

P E R S I A N W A L N U T

BACTERIAL BLIGHT (Bacterium juglandis). Much more prevalent in Oregon and Delaware than in the past several years. Reported also from Washington and Mississippi. The loss in Oregon was estimated by P. W. Miller to be 35 per cent.

BLOTH (Marssonia juglandis). New York, where it caused some "die back"; and Washington, where it was observed on nuts, leaves, and stems of seedling Persians, causing dieback and defoliation; Mississippi.

LEAF SPOT. Downy spot (Microstroma juglandis var. brachysporum) and leaf spot (Ascochyta juglandis) were reported from Oregon, for the first time.

WOUND PARASITES. Fleurotus pulmonarius var. juglandis and Schizophyllum commune, both reported from Oregon.

P E C A N

SCAB (Cladosporium effusum). Reported from North Carolina as of some importance. Seedling varieties most susceptible. It is annually important in Georgia. Reported also from Florida, Mississippi, Louisiana, and Texas.

POWDERY MILDEW (Microsphaera alni). Mississippi. Generally distributed and more prevalent than in 1932 and in an average year.

LEAF SPOTS. Cercospora fusca (brown leaf spot) on a few trees in the coastal area of North Carolina. Articularia sp., Texas (P. D. R. 17: 172). Pestalozzia sp., Mississippi.

CROWN GALL (Bacterium tumefaciens). Texas, Arizona.

ROOT ROT (Phymatotrichum omnivorum). In Arizona, according to J. G. Brown, the use of ammonium sulfate and ammonium hydrate resulted in good control of this root rot. Trees that had lost most of their leaves were restored to an apparently healthy condition. The method has been given over two years' trial now. The disease was also reported from Texas.

ROSETTE (Nonparasitic). Mississippi. Scatteredly prevalent.

D I S E A S E S O F V E G E T A B L E C R O P SP O T A T O

LATE BLIGHT (Phytophthora infestans) was reported prevalent in 12 States. It was more prevalent than in 1932 and than in an average year, in New Hampshire and Connecticut, and much more so in Florida, where there was an average loss of approximately 15 per cent and individual cases of total loss. In Hidalgo and Cameron Counties, Texas, it caused a loss of 1 per cent. Elsewhere, throughout the country, it was generally less prevalent than average and often too late to cause appreciable crop loss.

EARLY BLIGHT (Alternaria solani). Early blight was generally distributed throughout New Hampshire, Florida, and Ohio; scatteringly so in Massachusetts, Virginia, Louisiana, and North Dakota; and locally in West Virginia, Tennessee, and Wisconsin. It was, in most of the 16 States that reported its occurrence, less prevalent than usual, though in Michigan it was more prevalent. Estimated percentage losses were as follows: Massachusetts, 3; Ohio, 2; Texas, 1; Maryland and Michigan, .5; elsewhere, a trace or less.

SCAB (Actinomyces scabies). Distribution of scab was general in Delaware, Maryland, Florida, Mississippi, Ohio, Michigan, Wisconsin, and Missouri. It was prevalent to about the same degree as usual, though more so than last year in Minnesota and much more prevalent there than in an average year. Percentage losses were estimated at 5 in Texas; 4 in

Minnesota; 3 in Maryland; 2 in Michigan and Kansas; 1 in Iowa, Missouri, and Oregon; 0.5 in Florida and Ohio; and a trace or less in Massachusetts and North Dakota. Maximum individual losses of 100 per cent were recorded in Oregon, 55 in Michigan, and 32 in Missouri.

BLACK LEG (Bacillus phytophthorus) was generally neither more nor less prevalent than usual. It was reported from 15 States in 3 of which its distribution was general, in 5 it was scattered, and of local occurrence in one. Percentage estimates of loss were as follows: Massachusetts, 12; Michigan, 2; North Dakota, 1; Maryland, Florida, Missouri, and Oregon, 0.5; Ohio, 0.4; Texas, Wisconsin, and Kansas, a trace. Individual losses of 20 and 10 per cent were reported from Florida and Oregon, respectively.

POTATO WILT (Fusarium oxysporum). Wilt was reported from Maryland, Minnesota, Missouri, and North Dakota as having been more prevalent than in an average year. In the remaining States reporting incidence of wilt, the prevalence was approximately the same as in an average year. Estimated percentage losses were: Maryland, 5; Missouri, 2.6; Ohio, 2; Michigan, 1; North Dakota, 0.6; Texas, 0.5.

STEM ROT (Corticium vagum). Distribution general in Massachusetts, Delaware, Maryland, Florida, Ohio, Michigan, Wisconsin, Missouri, and North Dakota. It was more prevalent than in 1932 in Florida, Michigan, and Minnesota, and much more so in Delaware. Elsewhere, its prevalence was approximately the same as in 1932. Estimated percentage losses were as follows: Massachusetts, 9; Kansas, 6; Maryland, 5; Florida, 4; Minnesota, 3; Ohio, 2; Missouri, 1.5; Texas, 1; and Virginia, trace.

BACTERIAL WILT (Bacterium solanacearum) was reported from the piedmont and coastal-plain counties of North Carolina and from Florida and Arizona.

POWDERY SCAB (Spongopora subterranea). Reported only from Mississippi.

VERTICILLIUM WILT (Verticillium albo-atrum). New Jersey and Indiana.

SILVER SCURF (Spondylocladium atrovirens). New Jersey, slight importance.

NEMATODE (Anguillulina pratensis). Recovered from potatoes received from Orangeburg, South Carolina.

DRY ROT (Fusarium sp.). New Jersey and Washington.

STEM-END ROT (Fusarium eumartii). Michigan.

VIOLET ROOT ROT (Rhizoctonia crocorm). Oregon.

STEM AND TUBER ROT (Sclerotium rolfsii). Arkansas, Mississippi, Florida, Texas. It caused a loss of 1 per cent in Texas, 0.5 per cent in Florida.

STEM ROT (Sclerotinia sclerotiorum). Washington.

MOSAIC (Virus). Several States reporting incidence of mosaic were not specific as to kind. Two (Florida and Oregon) recorded the prevalence of both mild and rugose mosaic; Wisconsin reported crinkle and rugose mosaic; and Arkansas and Washington reported mild mosaic only. Percentage losses, in general, were estimated as follows; Oregon (mild mosaic), 10; Minnesota (mosaic and related diseases), 3; Maryland ("mosaic"), 2.5; Oregon (rugose mosaic), 2; and Florida, Missouri, and North Dakota ("mosaic"), 1. Maximum losses in individual instances ran from 5 to 70 per cent.

MISCELLANEOUS VIRUSES. Giant Hill, Pennsylvania. Spindle tuber was reported from Maryland, Minnesota, Michigan, Missouri, and Kansas. Yellow Dwarf was recorded for Michigan, Ohio, and Pennsylvania. Leaf roll was reported as generally prevalent in Delaware, Ohio, and North Dakota. A loss of 1.5 per cent was estimated in Oregon. It was reported also from New York, Maryland, Pennsylvania, Michigan, Wisconsin, and Washington.

TIPBURN AND HOPPER BURN (Drought and leaf hopper) were recorded in Connecticut, New York, New Jersey, Maryland, Arkansas, Ohio, Michigan, Wisconsin, Minnesota, and North Dakota. Estimated percentage losses were Minnesota, 10; Michigan, 5; Maryland, 3; and North Dakota, 0.2.

TOMATO

LEAF SPOT (Septoria lycopersici) was more prevalent than in 1932 in New Jersey, Indiana, and Michigan and was much more so in Delaware. In Maryland and Kansas, it was less prevalent and, in Ohio, Wisconsin, and Minnesota, it was approximately as common as it was last year. Only 7 out of 12 States reported significant losses. These ranged from 5 per cent in Texas, and 2.5 per cent in Wisconsin to a trace in Indiana and Kansas.

WILT (Fusarium lycopersici). Wilt was reported from 14 States. In Maryland, the loss was estimated at 0.2 per cent, a fact attributed to the wide use of Marlene and other wilt-resistant varieties that have markedly reduced the annual losses from this disease. In North Carolina, wilt was "severe" and damaged even the resistant varieties. Estimated percentage losses were as follows: Virginia, Texas, and Missouri, 5; Michigan, 3; Ohio, 2; Indiana and Iowa, 0.1. Maximum individual losses of 80, 75, 49, and 20 per cent were recorded in Indiana, Missouri, Virginia, and Maryland, respectively.

FRUIT ROT (Phytophthora infestans). This disease was more prevalent in Massachusetts, Connecticut, and Maryland, than it was a year ago and much more so than in an average year in New Hampshire, Massachusetts, and Connecticut. It was generally distributed in Massachusetts and Maryland and caused an estimated loss of 35 per cent in the former State and individual losses of 100 per cent. It was also reported from Texas.

BACTERIAL WILT (Bacterium solanacearum) was reported present in Maryland, North Carolina, Mississippi, Texas, Indiana, Missouri, and the Virgin

Islands. Nowhere was it of much economic importance, though in Maryland it caused a maximum individual loss of 80 per cent.

LEAF MOLD (Cladosporium fulvum) was largely confined to the greenhouse crop in those States whence it was reported. Its prevalence was recorded in Connecticut, New York, Texas, Ohio, Wisconsin, and Missouri.

EARLY BLIGHT (Alternaria solani) was generally pronounced and often severe in Massachusetts on the early crop, causing an average loss of 50 per cent for the entire State. It caused a loss estimated at 5 per cent in Texas. It was reported prevalent also in New Hampshire, Connecticut, New York, Maryland, Tennessee, North Carolina, Louisiana, Arkansas, Wisconsin, and Missouri, where, with the exception of Maryland, it was of little importance.

BACTERIAL CANKER (Aplanobacter michiganense). This disease appeared in southern California, for the first time, in 1933. In the northern counties it has been destructively prevalent for several years. It was reported as having done considerable damage in Massachusetts, Indiana, and Maryland. Other States reporting its occurrence were Connecticut, New Jersey, North Carolina, Mississippi, Texas, Arkansas, Ohio, Wisconsin, Kansas, and Utah. In Arkansas, a single field of the variety Marglobe suffered more than a 50 per cent loss.

BACTERIAL FRUIT SPOT (Bacterium vesicatorium) caused 5 per cent loss in Texas.

MOSAIC (Virus) was more prevalent in Connecticut and Louisiana than in 1932. Elsewhere, it was neither more nor less common than in other years. The yellow type of mosaic was most prevalent in New Jersey and was always accompanied by tip necrosis and fruit mottling. Other States reporting incidence of mosaic were Massachusetts, Maryland, North Carolina, Texas, Wisconsin, Missouri, and Kansas.

BLOSSOM-END ROT (Nonparasitic) caused 3 per cent loss in Texas and was reported as abundant throughout North Carolina, Missouri, Minnesota, and North Dakota. Elsewhere, it caused little more than a trace of loss.

CURLY TOP (Virus). Less than usual in Washington, about the usual amount in Oregon.

STREAK (Combination of viruses)... Ohio in greenhouses, Wisconsin, Missouri, Washington, California. Very important in California.

SWEET POTATO

BLACK ROT (Ceratostomella fimbriata) caused 15 per cent loss in Texas. It was of greater than average prevalence in Maryland, where it caused a loss of 3 per cent. It was less prevalent in Iowa, Missouri, and Kansas, but caused losses of 3, 1.5, and 3 per cent, respectively. In the remaining 8 States in which its incidence was recorded the prevalence was approximately the same.

WILT, STEM ROT (Fusarium batatas and F. hyperoxysporum). Several States reported an increased amount including Maryland, Indiana, Iowa, and Missouri, and in North Carolina the disease was severe. In Maryland, losses have grown with the increased planting of Little Stem varieties. In Indiana, imported seed of the Priestly strain has been heavily infected, according to J. A. McClintock, who states also that wind-blown sand evidently spreads soil infection. Delaware reported the usual amount and Virginia less. In Virginia the disease occurs mostly on the Eastern Shore. Losses estimated: Virginia, 10 per cent; Missouri and Kansas, each 5 per cent; Maryland, 2.5 per cent; and Texas, 2 per cent. Arkansas reported the disease "rather prevalent."

SCURF (Monilochaetes infuscans) was reported from New Jersey, Delaware, Maryland, Virginia, North Carolina, Texas, Indiana, Missouri, and Kansas. The use of good seed and treatment of the plants with sulfur markedly reduced scurf in North Carolina. In New Jersey excellent control was obtained by dipping the sprouts in one of the mercuric compounds.

SOIL ROT (Actinomyces sp.) Reported from Delaware, Virginia, Maryland, Texas, Indiana, and Kansas. Unimportant, except in Kansas and Maryland, where it caused average losses of 1 and 5 per cent, respectively.

STORAGE ROTS (Several organisms, including Rhizopus nigricans) were reported as causing losses ranging from a trace to 10 per cent in certain States, notably Maryland, Texas, and Missouri.

CHARCOAL ROT (Rhizoctonia bataticola). Unimportant; reported from Maryland, Mississippi, and Texas.

SURFACE ROT (Fusarium oxysporum). Delaware, North Carolina, Mississippi.

LEAF SPOT (Phyllosticta batatas). Missouri, apparently first report from State; Virginia.

VIOLET ROOT ROT (Rhizoctonia crocorum), Texas.

ROOT KNOT (Heterodera marioni). Reported from Mississippi and Arkansas. In the latter State, it was present in beds, often so serious as to call for declaration of quarantine.

B E A N

BACTERIAL BLIGHT (Bacterium phaseoli) was less prevalent than it was last year in Maryland, Iowa, and Kansas, and much less so in Virginia, where it was confined to the spring crop. In the remaining 7 States reporting incidence of bacterial blight, there was neither more nor less than usual. A bacterial blight, probably this, was found in the Tucson district of Arizona, where it had not been known previously. Average percentage losses, so far as reported, were as follows: Florida, 8; Massachusetts, Texas, Michigan, Iowa, 5; Maryland, 2; Virginia, North Dakota, trace.

HALO BLIGHT (Bacterium medicaginis phaseolicola), reported from Massachusetts, Louisiana.

BACTERIAL WILT (Bacterium flaccumfaciens), New York; West Virginia, apparently first report for State.

ANTHRACNOSE (Colletotrichum lindemuthianum). This disease was reported from 15 States but with the possible exception of Maryland, Florida, Ohio, and Missouri, it was of little importance. In Florida it caused an estimated loss of 11 per cent, in Missouri 1.5 per cent, 0.5 in Maryland, and a trace in South Carolina. In Delaware, it was much more prevalent than in former years but no figures indicating loss were submitted. The general use of western-grown seed in Maryland's canning acreage has nearly eliminated loss from this disease.

RUST (Uromyces phaseoli [U. appendiculatus]) was unusually severe, especially on Kentucky Wonder, in Arkansas. It also was reported from Maine, Massachusetts, Connecticut, Mississippi, Texas, Wisconsin, California, and Puerto Rico.

MOSAIC (Virus) was reported from Massachusetts, Maryland, Virginia, Texas, Arkansas, Michigan, Wisconsin, North Dakota, Kansas, Colorado, Idaho, and Puerto Rico. It was moderately severe in North Dakota, where it caused an average loss of 2 per cent and in Virginia, where the loss ranged from 1 to 50 per cent. In Puerto Rico it was severe on Lima and "bunch" beans.

L I M A B E A N

POD BLIGHT (Diaporthe phaseolorum) was prevalent in Maryland, Delaware, and New Jersey. Unimportant.

ANTHRACNOSE (Colletotrichum lindemuthianum). Locally prevalent in Ohio, where it caused damage amounting to 3 per cent. Reported also from Puerto Rico.

DOWNTY MILDEW (Phytophthora phaseoli). Ohio and New Jersey. Unimportant.

O N I O N

DOWNTY MILDEW (Peronospora schleideni). Downy mildew was prevalent in Massachusetts, Connecticut, and New Jersey. Unimportant.

SMUT (Urocystis cepulae) caused a loss of 8 per cent in Massachusetts. New York reported smut prevalent in many fields that had been planted to onions year after year. Maximum infections of 100 per cent were recorded in some fields. But one other State (Ohio) reported incidence of smut; loss, 5 per cent.

SMUDGE (Colletotrichum circinans). This disease was reported from Delaware, New Jersey, New York, and Missouri. It was much more prevalent than usual in Delaware and caused an estimated loss of 3 per cent in Missouri.

PINK ROOT (Fusarium mali). Prevalent in Massachusetts, Connecticut, New York, North Carolina, Missouri, North Dakota, and Colorado. According to the reports received, it caused negligible loss except in Colorado, where there were individual instances of 100 per cent infection, and in Massachusetts where there was a reduction in yield amounting to 20 per cent.

NECK ROT (Botrytis allii) caused a loss of 0.5 to 1 per cent in New York. Reported also from Wisconsin. Unimportant.

C A B B A G E A N D C A U L I F L O W E R

YELLOWS (Fusarium conglutinans). The 1933 prevalence of yellows was greater than that of an average year in Ohio, Michigan, and Wisconsin and was much greater in Minnesota. In North Carolina, it is becoming increasingly important on sandy soils. In Maryland, where the average loss was 7 per cent, the disease is becoming less and less important because of increased adoption of yellows-resistant varieties. Other loss estimates reported were: Minnesota, 5 per cent; Missouri, 2.5; and Ohio, 2.

BLACK ROT (Bacterium campestre) was reported from 13 States and from Puerto Rico. It was more prevalent than in 1932 in Virginia, Mississippi, Louisiana, and Wisconsin. Elsewhere, its prevalence was neither more nor less than last year. Its distribution was general in Virginia, Mississippi, and Missouri. In most of the States reporting, no note was made as to distribution. The losses recorded in Virginia averaged 25 per cent. Other States reporting losses were: Massachusetts, 8; Missouri, 2; and Maryland, 0.5 per cent.

CLUB ROOT (Plasmodiophora brassicae) was observed on cauliflower in Maine, Massachusetts, Connecticut, New Jersey, New York, Maryland, and Michigan. In Massachusetts, wherever cauliflower has long been grown, club root is its most serious malady. In such areas, losses of 50 per

cent or more are reported to be not unusual, even on relatively high, sandy soil.

DOWNTY MILDEW (Peronospora brassicae). This disease was reported from Connecticut, Maryland, Virginia, North Carolina. In Virginia, it caused a loss of 10 per cent; elsewhere, it was unimportant.

T U R N I P A N D R U T A B A G A

LEAF SPOTS. Colletotrichum higginsianum was reported from Mississippi. Cylindrosporium brassicae was prevalent in Massachusetts, especially in the Cape Cod area, where there was considerably more damage than in an average season; and from Mississippi. Alternaria brassicae was reported from Massachusetts and A. herculea from New York. In Massachusetts, Cercosporaella albo-maculans caused severe damage to some plantings in the Connecticut Valley and on Cape Cod.

BACTERIAL LEAF SPOT (Bacterium sp.) was reported from North Carolina, where, during the fall, it caused a heavy mortality in young plants with total loss in some fields.

YELLOWS (virus), more prevalent than usual in Wisconsin.

C U C U M B E R

WILT (Bacillus tracheiphilus). Wilt was reported from Maine, Massachusetts, New Jersey, Maryland, Ohio, Michigan, Wisconsin, Iowa, Minnesota, Missouri, Arkansas, and Louisiana. It was particularly severe in Massachusetts and Michigan, where it caused a crop loss of 20 per cent. In Ohio and Iowa, there was a 5 per cent loss.

DOWNTY MILDEW (Pseudoperonospora cubensis) was reported from 7 States and from Puerto Rico. It was severe in Maryland, Virginia, and Florida, where it produced losses of 1, 5, and 9 per cent, respectively. In nearly all instances, it developed too tardily to cause much damage. In Puerto Rico, it was the most important disease of the cucumber.

POWDERY MILDEW (Erysiphe cichoracearum). Reported only from Massachusetts, Ohio, and Puerto Rico. Particularly severe in greenhouses.

ANTHRACNOSE (Colletotrichum lagenarium). Massachusetts reported some injury to late-planted crops. Reported also from New Hampshire, Connecticut, Maryland, Florida, Ohio, and Wisconsin. In Maryland, the loss was estimated at 1 per cent, while in Ohio it was 2 per cent.

ANGULAR LEAF SPOT (Bacterium lachrymans). Florida, Arkansas, Wisconsin, and Missouri. Unimportant, except in Florida, where it caused a 4 per cent loss.

MOSAIC (Virus). Incidence of cucumber mosaic was reported from Massachusetts, Connecticut, New Jersey, Maryland, Ohio, Michigan, Minnesota, Wisconsin, Iowa, Missouri, Kansas, and Puerto Rico. It was unusually damaging in all parts of Massachusetts to both early and late field plantings. Some commercial greenhouses in Milwaukee, Wisconsin, were so badly infested as to result in total loss. In Michigan, there was an average loss of 8 per cent. Other States registering a loss were: Massachusetts, 0.1; Iowa, 5; Maryland, 3; Ohio, 2; and Missouri, a trace.

C A N T A L O U P E

BACTERIAL WILT (Bacillus tracheiphilus) was reported from Maryland, Ohio, Michigan, Missouri, and Kansas. It was more prevalent in Maryland and Michigan than in 1932 or in an average year. Estimated percentage losses were: Michigan, 10; Maryland, 1.5; and Missouri, a trace.

ANTHRACNOSE (Colletotrichum lagenarium). Reported as more prevalent than last year in Massachusetts and Delaware, less prevalent in Wisconsin and Iowa, much less prevalent in Kansas. Other States reporting incidence of anthracnose were Connecticut, New Jersey, and Arkansas. Estimated percentage losses were: Iowa, 4; Wisconsin, 3; and Massachusetts and Maryland, each 0.5.

LEAF BLIGHT (Macrosporium cucumerinum). From Massachusetts, it was reported that leaf blight caused more damage to field-grown cantaloupes in August and September than all other diseases combined. Other States reporting leaf-blight incidence were Delaware, Maryland, Ohio, Wisconsin, and Missouri. Loss in Maryland was estimated at 5 per cent and in Ohio, 2 per cent.

DOWNY MILDEW (Pseudoperonospora cubensis) was prevalent in Massachusetts, Delaware, Maryland, Wisconsin, Iowa, and Missouri. The percentage-loss estimates from those States reporting any were as follows: Maryland, 3; Iowa, 2; Missouri, trace.

MOSAIC (Virus). Maryland, Michigan, Wisconsin, Kansas. Losses ranged from a trace in Wisconsin to 1 per cent in Maryland and 5 in Michigan.

S Q U A S H

WILT (Mycosphaerella citrullina) was reported from Massachusetts as the cause of black rot of squash in storage. It was abundant on the vines in October. Severeest infection was observed in fields devoted to squash the preceding year. It was also reported from New York.

POWDERY MILDEW (Erysiphe cichoracearum) was severe in several fields in New Jersey.

BACTERIAL WILT (Bacillus tracheiphilus) caused from 1 to 65 per cent loss in many gardens in Maine. Present also in Connecticut, Massachusetts,

New York, and New Jersey. In Massachusetts, the loss was estimated at 10 per cent with some fields showing as much as a 40 per cent loss. The loss in New York was 1 to 3 per cent.

FRUIT ROT (Sclerotinia sclerotiorum). Montana.

W A T E R M E L O N

ANTHRACNOSE (Colletotrichum lagenarium) was recorded as prevalent in Massachusetts, Connecticut, Delaware, Maryland, Florida, Arkansas, Ohio, Missouri, Iowa, and Kansas. It was much more prevalent in Massachusetts and Florida and caused in those States a crop loss of 25 per cent; and in Iowa, 10 per cent. It was severe also in Maryland, where there was an estimated loss of 8 per cent, and in Ohio, with a loss of 2 per cent.

WILT (Fusarium niveum). New Jersey, North Carolina, Florida, Mississippi, Arkansas, Kansas, Iowa, Missouri, and Arizona. In Iowa, the estimated reduction in yield amounted to 20 per cent, and in Missouri, 8 per cent. Elsewhere, it was relatively unimportant.

C E L E R Y

EARLY BLIGHT (Cercospora apii) was more prevalent than in 1932 in Massachusetts, Florida, and Wisconsin and was much more so in New York and Michigan than in an average season. In Massachusetts, both summer and winter varieties suffered more damage than usual, and the crop loss was estimated at 20 per cent. According to A. G. Newhall of New York, early blight attacked 100 per cent of certain early transplanted varieties on Staten Island. In Michigan, the disease was very severe in 1932. Blight was most severe in fields devoted to plants coming from beds where the disease was allowed to spread in the greenhouse. In some fields of summer celery, the loss was complete. The average loss for the State was estimated at 20 to 30 per cent. In Florida, the loss amounted to 14 per cent, in New York it was 5 to 10 per cent.

LATE BLIGHT (Septoria spp.) was less prevalent than usual in Connecticut, Wisconsin, Minnesota, and Colorado. In the latter State the loss in yield was estimated at 2 per cent. The estimated percentage loss in Ohio was 4 and in Michigan, 5. Elsewhere (Minnesota, Missouri, North Dakota) the loss did not exceed a trace.

YELLOWS (Fusarium sp.). Incidence of yellows was reported from New York, Ohio, Michigan, Minnesota, and Colorado. Losses were estimated at 10 per cent in Colorado; 5 to 8 in Michigan; 5 in Minnesota; 2 in Ohio, 0.5 to 1 in New York. This disease occurs in many of the muck areas of Michigan and may become serious if the soil becomes moderately dry and the temperature exceeds 80°F. Both New York and Minnesota reported that the disease has been spreading and increasing in amount during the past three hot dry years. In Michigan and New York, all yellow varieties,

except Michigan Golden, were reported susceptible. A 40 per cent increase in yield was demonstrated on muck soil in Wayne County, New York, from the use of Michigan Golden. This variety also proved resistant in Colorado.

YELLOWS (Virus) was not reported in 1933.

MOSAIC (Virus), local in New York, reported from Florida.

ROTS. Watery soft rot, pink rot (Sclerotinia sclerotiorum) New York, on celery in common storage or pits, loss 0.5 to 2 per cent. Michigan, serious on trenched celery and occasional on blanching celery. Bacterial soft rot (Bacillus carotovorus) New York, loss 1 to 3 per cent, under same conditions as Sclerotinia. Gray mold rot (Botritis cinerea) New York, not very common.

BLACK HEART (Undet.) was reported from New York, Michigan, and Wisconsin. L. C. Cochran in Michigan stated that the disease seemed to be associated with high temperature and excessive vegetative growth. Excessive use of nitrates seems to favor the disease.

ROOT KNOT (Heterodera marioni) was severe in some fields in the Kalamazoo and Decatur sections of Michigan. Most of the damage was on drier soils. Caused 1 per cent loss in Ohio.

CRACK STEM (Undet.) caused some loss in Florida. In Michigan there was more than usual. This trouble is now thought to be due to an element deficiency or to an excess of soluble salts.

OTHER DISEASES. Root rot (Corticium vagum), New York and Missouri. Root rot (Phoma apiicola) and bacterial blight (Bacterium apii), New York. Blight (Bacillus sp.), New Jersey.

LETTUCE

BOTTOM ROT (Corticium vagum) was reported present in 2 counties in New York and in one New Jersey county. The loss in New York was estimated at 10 to 12 per cent. This is much less than it has been previously, due to the general adoption of control measures.

DOWNTY MILDEW (Bremia lactucae). Reported from Massachusetts chiefly as a storage rot. Reported also from New York, New Jersey and Missouri.

DROP (Sclerotinia spp.) caused a loss of 1 per cent in Ohio. S. sclerotiorum occurred in Massachusetts but was less serious than in the past 10 years. It was present also in Connecticut, New York, Florida, where it caused a 10 per cent loss; Louisiana, where it was more prevalent than last year or in an average year; Missouri and Washington. The loss in some parts of Louisiana was 50 to 75 per cent. S. minor was reported from New York and New Jersey.

ANTHRACNOSE (Marssonina pannatoniana). Reported from western Washington.

TIPBURN (Non-parasitic) caused a loss of 7 per cent in New York, and was reported also from Maine, New Jersey, and Wisconsin.

LEAF SPOT (Septoria lactucae) Connecticut, New York, and Missouri.

LEAF SPOT (Bacterium marginale). Missouri.

VIRUS DISEASES. YELLOWS caused a loss of 5 per cent in New York. This disease is serious in late summer on Staten Island and has caused growers to give up the production of late lettuce there. A few fields on muck soil in Oswego county lose 30 per cent of their crop every year. Yellows was reported also from Maine, where it caused losses ranging from a trace to 3 per cent. MOSAIC was general in New York. It was surprisingly prevalent on the spring crop on muck soil in Orange County, as much as 5 to 8 per cent loss being noted. This disease is seed-borne. The insect vectors of both mosaic and yellows were favored by lack of rain in New York.

P E A

DOWNTY MILDEW (Peronospora viciae) was reported from New York, Mississippi, Wisconsin, and Washington. In Washington, 35 to 40 per cent of the pods of market-garden varieties were infected in some cases.

BACTERIAL BLIGHT (Bacterium pisi) was reported from New York, New Jersey, Maryland, Virginia, Florida, Wisconsin, and Colorado. Storm and hail injury were associated with infection in several reports. In Maryland there was much more than usual. Losses up to 75 per cent occurred in several fields.

ROOT AND STEM ROTS. In Maine, according to A. K. Gardner, total loss from root rots is not infrequent. Some gardeners are abandoning the growing of peas because of root rot. The loss in 1933 was estimated as 50 per cent. In Wisconsin, various organisms, including Aphanomyces, Pythium, Rhizoctonia, and Fusarium were associated in causing more root rot than usual. Aphanomyces euteiches was reported from New York, New Jersey, Maryland, and Wisconsin. The loss in Maryland was 4 per cent. In Wisconsin, the disease was severe in early June, and 100 per cent infection occurred in some fields. Rhizoctonia (Corticium vagum) was more prevalent than usual in New York, where the very early cold spring rains seemed to favor it, New Jersey, and Wisconsin, and was reported from Washington. F. martii pisi caused 1 per cent loss in Ohio, was more prevalent than usual in Wisconsin, and was reported from Colorado. Sclerotinia sclerotiorum was reported from Virginia and Washington.

FUSARIUM WILT. Wilt due to Fusarium sp. was reported as not common in New York. F. orthoceras pisi caused heavy losses in certain fields in Maryland, was said to be widespread and increasing in prevalence in

central and southern Wisconsin, and was reported from Washington. In Wisconsin, the varieties Perfection, Surprise, and Hosford were said to be very susceptible, while Wisconsin Resistant Perfection, Maryland Alaska, and Senator were resistant. Wilt-resistant strains gave satisfaction in both Maryland and Wisconsin.

BLIGHT, POD SPOT, AND FOOT ROT (Ascochyta spp. and Mycosphaerella pinodes) were reported from New York and Maryland, M. pinodes from Wisconsin and Puerto Rico, and A. pisii from New Jersey and Mississippi. The use of western-grown seed has greatly decreased losses from this group of diseases.

DAMPING-OFF (Pythium debaryanum). Connecticut.

VIRUS DISEASES. Mosaic caused considerable loss in Maine. It was somewhat more prevalent than usual in New York, although not important. In New Jersey this is becoming one of the most important pea diseases and in 1933 it was much more prevalent than usual. It was reported on English peas from Arkansas. Mosaic was general in western Washington on market-garden varieties. Streak was also reported from Washington.

OTHER DISEASES AND INJURIES. Anthracnose and blotch (Colletotrichum pisii and Septoria pisii) were reported from Wisconsin. Powdery mildew (Erysiphe polygoni) New York, Wisconsin, Washington, Puerto Rico. Leaf spot (Cercospora pisii-sativae), Puerto Rico. Pod rot (Botrytis sp.), Washington. Pod spot (Cladosporium pisii), Oregon. Vervicillium sp., Puerto Rico. Scorch, due to high temperature and low moisture, caused 50 per cent loss in Wisconsin. Bronzing (undetermined), Washington.

ASPARAGUS

RUST (Puccinia asparagi) was reported from Connecticut, New York, New Jersey, Maryland (1.5 per cent loss). Wisconsin, Missouri (1 per cent loss) and North Dakota.

STEM ROT, WILT (Fusarium sp.). Dwarf and stem rot caused a loss of 10 per cent in Massachusetts. The stem rot is becoming more important there. Stem rot was reported from Missouri, for the first time. Wilt was reported from New York and New Jersey. In New York, according to Chupp, the disease occurs only when temperatures are unusually high. The Fusarium isolated there has a reddish color and seems to be a variety of F. vasinfectum. Moldy tips due to Fusarium spp. were less common than usual on California asparagus examined at the New York market.

TIP WILT (Botrytis sp.) caused a loss of 5 per cent in Massachusetts.

B E E T

SCAB (Actinomyces scabies). Reported prevalent in New Jersey, Massachusetts, and Wisconsin. Unimportant.

CERCOSPORA LEAF SPOT (Cercospora beticola) occurred in Connecticut, New Jersey, Puerto Rico ("common but not severe"), Mississippi, Ohio, Wisconsin, and Kansas.

DAMPING OFF (Pythium sp.). Several cases of damping off were reported from Connecticut, New Jersey, and North Carolina.

C A R R O T

MACROSPORIUM LEAF BLIGHT (Macrosporium carotae) causes more damage annually in Massachusetts than all other field diseases combined. Destructive only in Connecticut Valley and certain eastern townships near large bodies of water. Losses up to 50 per cent were not uncommon in 1933. Reported also from New Jersey and Florida. In the latter State, the average estimated loss was 10 per cent.

SOFT ROT (Bacillus carotovorus). Reported only in New Jersey.

ROOT KNOT NEMATODE (Heterodera marioni). A single reported occurrence of root knot was received from Connecticut. Reported also from Arizona.

E G G P L A N T

FRUIT ROT AND BLIGHT (Phomopsis vexans) was severe in Virginia and Florida, where it caused estimated losses of 3 and 12 per cent, respectively. It was also reported from Massachusetts, New York, New Jersey, Michigan, and Missouri.

WILT (Verticillium albo-atrum) caused 30 to 50 per cent loss in New York and was reported from New Jersey.

P E P P E R

DAMPING OFF (Rhizoctonia solani). Reported from Connecticut and New Jersey.

SOUTHERN BLIGHT (Sclerotium rolfsii). Louisiana, Mississippi, and Georgia. In the last named State, it was observed on Fiminto pepper. In a field near Athens, 20 per cent of the plants were killed.

DOWNY MILDEW (Peronospora sp.). What seems to be tobacco downy mildew attacked tomato and pepper plants in North Carolina and peppers in South Carolina and Georgia. F. D. R. 17: 37-39.

WILT (Phytophthora capsici) was reported as locally prevalent and epidemic for the first time in Ohio. Also reported from Colorado, where it caused an average loss of 2 to 3 per cent.

BACTERIAL SPOT (Bacterium vesicatorium) was reported from Massachusetts and Mississippi. Unimportant.

MOSAIC (Virus). Mosaic was serious in Massachusetts. In the Connecticut Valley, it caused a crop loss in some instances amounting to as much as 10 to 25 per cent. In Florida, it was much more prevalent than usual. In Michigan, it was present in almost all plantings of peppers. Reported also from Kansas.

S P I N A C H

DOWNY MILDEW (Peronospora effusa) was much more prevalent and destructive in Virginia than in 1932 and more so than in an average year. It also was more prevalent than usual in Michigan and less so in Massachusetts. In Arkansas, downy mildew was severe on late fall-sown spinach in the western part of the State. The open winter of 1932-33 was unusually favorable to mildew development. Estimated percentage losses were as follows: Virginia, 25; Michigan, 5; Maryland, 0.5; Massachusetts, trace.

DAMPING OFF (Pythium debaryanum) was plentiful in Massachusetts in late seedings. Many growers were successful in controlling the disease with the red oxide treatment. Damping off was general and severe in Ohio, causing an estimated loss of 5 per cent. It was reported also from Genesee and Orleans Counties, New York.

R H U B A R B

LEAF SPOT (Ascochyta rhei). Severe in a few fields in New Jersey. Reported from Arkansas as a limiting factor in rhubarb production.

SPOT NECROSIS (Virus) was reported from Okanogan County, Washington.

DISEASES OF SPECIAL CROPS

TOBACCO

DOWNTY MILDEW (Peronospora sp.) was reported from Pennsylvania, Maryland, Virginia, Tennessee, North Carolina, South Carolina, Georgia, and Florida. In Pennsylvania, such seed beds as were examined showed from a trace to 80 per cent infection. In Maryland, it was much more prevalent than in the preceding two years. It was observed in sterilized seed beds, last year's beds, and in beds planted for the first time in 1933. In Virginia, it was more prevalent than in former years; reported from 21 counties. In Tennessee, the disease was reported from 22 counties. It was impossible to estimate damage; but, as it occurred when plants were about ready to set out, the loss in some instances ran as high as 50 per cent. Reports from county agents in the Carolinas indicate that very few counties escaped the disease. It was reported prevalent in Florida and Georgia, but less destructive than in former years.

MOSAIC (Virus) was reported as more than usually prevalent in Maryland. It was reported also from Connecticut, Virginia, Kentucky, Florida, and Wisconsin. In Florida, it occurred on shade-wrapper tobacco, only.

RING SPOT (Virus). Maryland, Virginia, Kentucky. In the latter State, Valleau reports considerable evidence to show that weed hosts are more common sources of the disease where there has been any considerable extension of the disease.

BLACK ROOT ROT (Thielavia basicola). Maryland (0.5 per cent), Wisconsin (2 per cent), Tennessee (Prevalence and severity approximately same as last year).

WILD FIRE (Bacterium tabacum), Massachusetts, Wisconsin (trace); of local importance in seed beds (Massachusetts) and a few fields in Wisconsin. Dr. E. E. Clayton estimated an average loss of 2.5 per cent in beds near Marlboro, Maryland. He also reported that, following a severe August rain and windstorm, the disease developed in epidemic form throughout Maryland and Pennsylvania. The losses were about 20 per cent for Maryland and 50 per cent for Pennsylvania. The greater loss in the latter area was due (a) to the very leaf-spot susceptible type of tobacco grown and (b) to the fact that the crop is used in the manufacture of cigars and damaged leaves have little value.

BLACK FIRE (Bacterium angulatum). Maryland (0.5 per cent), Virginia (observed in 16 counties; heavy loss, maximum of 40 per cent in a few instances), Kentucky. According to Valleau, black fire occurred in a few areas in the western part of Kentucky following heavy, late-season rains. He was unable to produce typical black fire with B. angulatum.

BLACK SHANK (Phytophthora parasitica). Florida. Observations were confined to shade-wrapper tobacco. Reported also from Puerto Rico.

LEAF SPOT (Cercospora nicotianae). Tennessee, Puerto Rico, and Florida.

FRENCHING (Non-parasitic) was reported from Maryland (trace), from 10 counties in Virginia, and from Kentucky, where it was much more prevalent than last year and than in an average year. Valneau observed that it was confined largely to tobacco on thinner soils or where lime had been added.

FUSARIUM WILT (Fusarium oxysporum nicotianae). Maryland.

ROOT KNOT (Heterodera marioni) was reported from North Carolina as the most outstanding disease throughout the entire tobacco area of the State. It caused more loss than all other tobacco diseases together.

DAMPING OFF (Pythium and Rhizoctonia). Massachusetts, where it caused an average loss of 15 per cent.

POTASH HUNGER. Wisconsin, very infrequent; New Jersey.

BACTERIAL WILT (Bacterium solanacearum). Puerto Rico.

C O T T O N

ANTHRACNOSE (Glomerella gossypii) was much more prevalent than last year in Arkansas, causing an estimated loss of 5 per cent and maximum losses approximating 70 per cent. It was reported also from Missouri, where the loss was estimated at 2.5 per cent. According to D. C. Neal, it "was observed on seedlings near Minden, Louisiana. There was very little evidence of the disease on cotton bolls in localities visited in southern and central Mississippi and Louisiana."

ANGULAR LEAF SPOT (Bacterium malvacearum). According to Neal, angular leaf spot was present in about the same degree as it was in 1932 in the blacklands of Texas, in southern Mississippi, and in northern and central Louisiana. He estimated the loss at about 1 per cent.

DAMPING OFF, SORE SHIN, AND SEEDLING BLIGHT (Corticium vagum). Occurred in Texas, Mississippi, Louisiana, and Arkansas. Damage generally negligible, except in Arkansas and in a few fields in northern Louisiana, where stands were materially reduced. Various species of nematodes were found to be associated with sore-shin in Arkansas. P. D. R. 17:62.

ROOT ROT (Phymatotrichum omnivorum) in Texas, was favored by weather conditions, i.e., rain and high temperature in late July and early August. The damage is hard to determine, but this is one of the most destructive of the cotton diseases of the southwest. Taubenhaus estimated the loss at 12 per cent.

FUSARIUM WILT (*Fusarium vasinfectum*). D. C. Neal states: "This disease was present again, as usual, in the light sandy-loam soils of Arkansas, Louisiana, Mississippi, and Texas. It was also observed in a few counties (Hunt, Collin, and Grayson) in the black-land section of Texas, and in one field in this region near Greenville. The damage was about 10 per cent. Resistant varieties are being planted in several of wilt infested districts with favorable results."

VERTICILLIUM WILT (*Verticillium albo-atrum*) was present in several counties in the Mississippi Delta and was reported also from Oklahoma. Damage, where observed, was somewhat less than that recorded in 1932.

RUST. *Puccinia schedonnardi* was collected in Haskell County, Oklahoma. This is the first recorded incidence of cotton rust in that State. It was also reported from Texas. A severe outbreak of *Cerotelium desmum* was reported as occurring on Meade cotton at Sabana Grande Demonstration Farm, Puerto Rico.

POTASH HUNGER (Nonparasitic). This disease was very prevalent in the lighter soils of Arkansas and eastern Texas. It was observed also in the coastal-plain counties of Louisiana, Mississippi, and Alabama and in the Carolinas. Losses have been measurably reduced by use of certain leguminous crops to restore soil fertility.

ROOT KNOT (*Heterodera marioni*). Reported as prevalent on Pima cotton in Texas. Locally, very severe in southern Mississippi, killing the plants in many instances.

P E A N U T

CERCOSPORE LEAF SPOT (*Cercospora spp.*) Reported as more or less prevalent in Georgia, Arkansas, Missouri, and Puerto Rico. Unimportant.

WILT (*Fusarium vasinfectum*). Appeared for first time in Missouri.

RUST (*Puccinia arachidis*). Very abundant in Puerto Rico, probably the

most important disease of the crop. WILT (*Fusarium vasinfectum*). Observed in Missouri, for first time, in 1933. Locally distributed.

H O P

DOWNTY MILDEW (*Pseudoperonospora humuli*) was reported from New York and Oregon. A survey of the hop yards of Otsego and Oneida counties in New York showed downy mildew present on the lower leaves of the plants. In Oregon, the disease appeared in early spring. It gained great headway because of the rains of May and June, and serious damage resulted. In certain individual cases, there was damage amounting to a total loss.

DISEASES OF SUGAR CROPSSUGAR CANE

MOSAIC (Virus). In Louisiana, greatly increased acreages of the apparently mosaic-immune C. P. 807, bred by the U. S. D. A., have further reduced the economic significance of this disease. The remaining commercial varieties, while "tolerant" toward infection and productive in comparison with the formerly grown D-74 and Louisiana Purple, are, nevertheless, damaged from year to year to a varying degree. This is important in view of the extensive mosaic spread noted again in 1933 on the CO. 281, now one of the most widely planted varieties in Louisiana. Infection ranged from a mere trace in the Bunkie area to over 90 per cent on a river plantation near Plaquemine.

SHEATH ROT (Cytospora sacchari), according to E. V. Abbott, was observed spreading rapidly from about May 15 till August 1 at Houma, Louisiana, Field Station. The effect of the disease on susceptible varieties was to retard or prevent the development of tillers. Among the more promising seedlings being tested at the Houma Station for their commercial value, infection ranged from 3 to 38 per cent, with indications of appreciable economic losses under certain conditions in the cases of C. P. 28/19 and 29/320. The disease was observed at one time or another on all of the commercial varieties except CO. 290, but infection was never more than 5 per cent.

RED ROT (Colletotrichum falcatum). Considerable damage to seed cane during the year was confined to variety P. O. J. 213, which previously had shown marked susceptibility to red rot, according to reports from Louisiana. In spite of warnings against further planting of this variety on heavy soils, some 115 acres on 2 plantations were observed in which the stand was less than 50 per cent and resulting yields were so low as to render them unfit for a stubble crop. Red-rot damage to standing cane was of less importance than in any of the previous 3 years. This may be ascribed to the generally light borer infestation early in the season and to the relatively smaller acreage of P. O. J. 213.

ROOT ROT (Pythium arrhenomanes) caused unusually extensive losses in tonnage of CO. 281 and P. O. J. varieties in Louisiana, wherever they had been planted in heavy clays or so-called black lands. The moisture-holding capacity of about 40 per cent of the land of the sugar-cane district was accentuated by the cold, wet spring of 1933. CO. 281 was markedly retarded in initial growth and suckering.

POKKAH-BONG (Fusarium moniliforme), according to E. V. Abbott, was less prevalent in Louisiana than at any time during the past 4 years, due, presumably, to the unusually dry weather of early summer and fall. Occasional cases of RED STRIPE (Bacterium rubrilineans) and MOTLED STRIPE (B. rubrisubalbicans) were noted among susceptible seedlings; and a nonidentified BROWN SPOT continued to be common but unimportant on C. P. 28/19, C. P. 29/320, CO. 281, and C. P. 807.

S U G A R B E E T

The following summary was furnished by G. H. Coons:

DAMPING OFF (Pythium spp., Corticium vagum, Aphanomyces spp., Phoma betae) was less serious than usual in Michigan and Ohio, good stands commonly being secured. In Minnesota, considerable injury to stands occurred, seed treatment with fungicides being beneficial. The disease was apparently minor in importance in western areas. Improved stands reported from Salinas and Sacramento Valleys of California following rather general use of ridge-planting method with sugar beets.

ROOT ROT (Corticium vagum, Phoma betae) was reported prevalent in Ohio, Michigan, and Wisconsin. Its prevalence was about as usual; Michigan and Ohio estimating losses at 2 and 1 per cent, respectively; Wisconsin reporting the crown-rot type (Corticium) as of rare incidence. The form of root rot reported from Utah as Late Blight was again serious on dolomitic soils. From rotted roots Phoma betae is commonly isolated, but experimental evidence indicates phosphate deficiency is primarily responsible for the condition.

LEAF SPOT (Cercospora beticola) was reported as having caused a loss of 1 per cent in Ohio. According to Federal field station reports it was of relatively minor importance in eastern beet-growing areas, except Ohio, and fairly severe in the bottom land areas of southern Minnesota. Considerable loss occurred in Nebraska and northern Colorado. Indications of loss occurring in northern Colorado are given by results of spraying and dusting tests at Fort Morgan, Colorado, in which tonnage gains of approximately 2-1/2 tons per acre were obtained from fungicide applications as compared with yields of check plots. In the same test, the average sucrose percentage of all treated plots was 16.6 per cent, that of the untreated 15.3 per cent. Apparent coefficients of purity were in favor of treated plots. In the Arkansas Valley of southern Colorado, where leaf spot frequently produces heavy loss in tonnage and marked depreciation in quality, sprayed or dusted plots were not significantly better in yield or quality than the control plots, indicating slight effects from leaf-spot disease.

STEM ROT (Sclerotium rolfsii) was found in 1931 as a serious infestation in several fields in central California. Since that time, additional cases of serious field infestation have been located. In 1932, it was observed again in Orange County, the first record being that of Carsner in 1921. D. G. Milbrath reports Sclerotium rolfsii in 1933 as present in the following counties: Solano, San Joaquin, Alameda, Los Angeles, and Orange. L. D. Leach and C. E. Scott list, in addition, Fresno, Ventura, Monterey, Santa Cruz, Santa Clara, and Kern as counties from which collections have been made.

CURLY TOP (Virus) did not produce its usual losses in California, Idaho, and Utah, good tonnages being generally reported, and tests in areas normally having severe exposure indicated only slight reduction due to

the disease. Western Colorado suffered severely as a result of heavy beet leaf-hopper influx, tonnage reductions reaching 25 to 50 per cent in case of late plantings in some areas. In several comparative tests under moderately severe beet leaf-hopper exposure, the U. S. No. 1 variety exceeded ordinary commercial brands by 2 or 3 tons per acre as an average.

DISEASES OF TREES

HARDWOODS

NECIRIA CANKERS. D. S. Welch reports the results of a survey in New England and New York in the Plant Disease Reporter, vol. 18, pp. 21-22, March 15, 1934.

ACER SPP. MAPLE. Coniosporium corticale was reported as parasitic on maple in two localities in Wisconsin. Canker (Cytospora sp.), was reported from New Jersey, on A. platanoides. Wood rot (Fomes applanatus) was noted on A. saccharum in Connecticut. Anthracnose: Gloeosporium apocryptum occurred on A. platanoides in Vermont and New York, and on A. saccharum in New Jersey; G. saccharini on Acer sp. and A. dasycarpum in Connecticut. Heart rot (Hydnus septentrionale) was noted on A. saccharum in Connecticut and Minnesota. In the latter State it is said to be present in most of the fire-scarred trees in the region of Red Lake. Canker (Phomopsis sp.) was reported from New Jersey, on A. palmatum and A. platanoides. Phragmotrichum sp. was reported as a secondary parasite on A. platanoides in New Jersey. Leaf spot (Phyllosticta minima /P. acericola/), was severe in two nurseries observed in Tennessee, caused severe blighting of A. dasycarpum shade trees in North Carolina, and was also reported from Pennsylvania. Root rot (Phymatotrichum omnivorum), Texas. Tar spot (Rhytisma acerinum), was generally reported, as usual. Where mentioned, the species affected were as follows: A. dasycarpum in Connecticut, Michigan, Wisconsin, and Minnesota; A. rubrum in Connecticut and Missouri. Rhytisma punctatum was reported from Massachusetts, and on A. spicatum from Minnesota. Tuberularia vulgaris was observed on A. palmatum in Connecticut. Verticillium sp. causing wilt was reported from Ohio, Michigan, Wisconsin, and Missouri; V. alboatrump from Massachusetts, and on A. platanoides and A. saccharum from Connecticut; V. dahliae on A. palmatum in Connecticut and A. platanoides in New Jersey. In Michigan trees that showed infection and were fertilized during previous years are still in excellent condition and do not show recurrence of wilt symptoms, according to F. C. Strong. Leaf scorch (non-parasitic), New York, North Carolina, and Ohio.

AESCRUS SPP. BUCKEYE, HORSE CHESTNUT. Blight (Botryosphaeria ribis) was reported on two horse chestnut trees (A. hippocastanum) in New York. Both trees were severely affected. Many lesions on the petioles caused wilting and death of the leaves giving the trees a burned or blighted appearance. The infection was mostly at the tips of branches (C. Guterman).

Leaf blotch (Guignardia aesculi / Phyllosticta paviae /), was widespread as usual. In New York it was very severe on horse chestnut, many trees being completely defoliated by the middle of September.

ARONIA MELANOCARPA. BLACK CHOKEBERRY. Gymnosporangium clavipes, Connecticut.

CARPINUS SPP. HORNBEAM. Canker (Nectria galligena) was observed on C. caroliniana in Connecticut.

CASTANEA SPP. CHESTNUT. Blight (Endothia parasitica) on American chesnut (C. dentata). The status of this disease will be reported in the 1934 summary. It was found on C. japonica in Connecticut. Schizophyllum commune occurred on dead bark of C. dentata, Oregon. Leaf spot (Septoria sp.) was noted in Mississippi. Dying of C. dentata, cause undetermined, was reported from Oregon.

CRATAEGUS SPP. HAWTHORN. Blight (Bacillus amylovorus) was reported as follows: It occurred on C. oxyacantha in New Jersey. It was found on one tree of English hawthorn in West Virginia. Both native and ornamental species were heavily infected in North Carolina. It was noted on Paul's Scarlet Thorn (C. oxyacantha paulii) in five plantings in Kansas City, Missouri, apparently the first report of the disease on hawthorn for the State. Leaf spot (Entomosporium thuemenii) was reported from New Jersey and on C. oxyacantha from Alabama. Rust: Gymnosporangium spp. were reported from Pennsylvania, Alabama, where practically every leaf of a block of 10,000 Paul Scarlet Thorn trees in a nursery was infected, Wisconsin, and Minnesota. G. clavipes (G. germinale) occurred on Crataegus sp., C. crus-galli, and C. oxyacantha, in Connecticut, and on C. oxyacantha in New Jersey. G. globosum was reported from Massachusetts, from Connecticut on Crataegus sp. C. crus-galli, and C. oxyacantha, and from Tennessee on C. oxyacantha.

FRAXINUS SPP. ASH. Heart rot (Fomes fraxinophilus) occurred in North Dakota, on F. lanceolata. Root rot (Phymatotrichum omnivorum) was reported on F. velutina in Arizona. Leaf spot (Septoria leucostoma) was noted on F. texensis in Texas. Canker (Sphaeropsis sp.) was reported from New Jersey, on F. americana.

GREVILLEA ROUSTA. SILK-OAK. Root rot (Phymatotrichum omnivorum) was reported from Arizona. It does not seem to have been reported on this host previously.

ILEX SPP. HOLLY. Leaf spot of American holly (I. opaca) caused by Sphaeropsis sp. was reported from New Jersey.

JUGLANS SPP. WALNUT. Wood rot (Fomes igniarius) was reported on butternut (J. cinerea) from Connecticut, the first report from the State. Black walnut (J. nigra): Blight (Bacterium juglandis) was reported from New Jersey. It is apparently very rare on this species. Leaf spot (Cylindrosporium juglandis) was reported from Tennessee. Canker (Cytospora sp.) was

reported on J. rupestris from Arizona.

LIRIODENDRON TULIPIFERA. TULIP TREE. Leaf spot (Rhytisma liriodendri) was reported from New Jersey. This disease is rarely reported.

PLATANUS SPP. PLANETREE. Anthracnose (Gnomonia veneta) of American planetree (P. occidentalis) was generally less prevalent than usual. In Michigan, F. C. Strong reported that "What appeared to be the beginning of an epiphytic on twigs and leaves was abruptly stopped by a period of dry weather accompanied by high temperatures early in June. No defoliation resulted and very little infectious material was left to winter over, except in twigs." Powdery mildew (Microsphaera alni) was reported on London planetree (P. acerifolia) from New Jersey.

POPULUS SPP. POPLAR, COTTONWOOD, ASPEN. Cankers. Cytospora chrysosperma was reported on P. alba (white poplar) from New Jersey, from Massachusetts on P. bolliana, from Minnesota on quaking aspen (P. tremuloides) and from Texas. In Minnesota the very dry summer predisposed trees to attack. European canker (Dothichiza populea) was reported from Massachusetts, Mississippi, Wisconsin, and Missouri. In Missouri it occurs mostly on the Lombardy poplar (P. nigra italicica). Hypoxyylon pruinatum was reported only from Minnesota, on quaking aspen and on largetooth aspen (P. grandidentata). It was not found on other species of Populus. As much as 75 per cent infection was noted in some stands. Quaking aspen is most severely affected. Also reported from Minnesota were bark canker (Macrophoma tumefaciens) and canker caused by Nectria sp., both attacking mostly the susceptible quaking aspen. The largetooth aspen is very resistant to both cankers, while P. deltoides (cottonwood) is very resistant to the Nectria and apparently immune from attack by the bark canker. The bark canker is more common on trees suffering from lack of moisture, but it does not cause actual losses except when girdling kills very young trees. The Nectria canker occurs principally on poor sites.

Crown gall (Bacterium tumefaciens) was reported from Texas.

A twig blight due to Diplodia sp. was reported from Texas. Napicladium tremulae caused twig blight of quaking aspen in Minnesota. Dieback (Sphaeropsis sp.) was noted in New Jersey.

Root rots (Armillaria mellea and Phymatotrichum omnivorum) were reported from Texas, the latter also from Arizona. White rot (Fomes igniarius) was said to be important in all aspen stands throughout Minnesota.

Scab (Fusicladium radiosum = Venturia tremulae) occurred on quaking aspen in Connecticut and Pennsylvania. Anthracnose (Marssonina sp.) was common in New York on P. deltoides, largetooth aspen, quaking aspen, and white poplar. It was also reported from Mississippi. Leaf spot (Sclerotium bifrons) was reported from Minnesota, on quaking aspen. Septoria sp. was reported from Mississippi, and S. musina on P. deltoides from New York. Taphrina johansonii occurs on the female catkins of largetooth and

quaking aspens in New York. It is abundant on some trees. Powdery mildew (Uncinula salicis) was reported from Minnesota on quaking aspen. It occurs principally on trees near the margins of lakes and swamps in the northern part of the State.

QUERCUS SPP. OAK. Among diseases reported on oak trees may be mentioned the following: Anthracnose (Gnomonia veneta) occurred in the usual amounts in the New England States. It was less prevalent than usual in Michigan and Wisconsin. Diplodia sp. caused dieback of white oak in Texas. A dieback of Q. montana in New Jersey was due to Diplodia longispora. In Minnesota Sphaeropsis malorum caused dieback. It was present in the tops of most of the trees that were being killed by drought and by Armillaria mellea. Root rot due to Armillaria mellea was reported from New Jersey, Wisconsin, and Minnesota. The red oak, Q. rubra ambigua, seemed to be most severely injured in Minnesota, and dry weather predisposed trees to attack. Wood rot (Fomes applanatus) was reported on Q. alba from Connecticut. Powdery mildew (Phyllactinia corylea) was reported from New Jersey, and leaf spot (Phyllosticta sp.) occurred on Q. alba in New York. Canker due to Cytospora sp. was noted in New Jersey.

SALIX SPP. WILLOW. Crown gall (Bacterium tumefaciens) was reported from Mississippi. Dieback and canker (Cytospora chrysosperma) was reported from Massachusetts, New Jersey, Wisconsin, and Minnesota. Scab (Fuscladium saliciperdum) was much less severe than usual in all parts of Massachusetts except Berkshire County where it was very destructive. In Connecticut it was said to be less prevalent than usual. In New York there was the usual amount. The disease was reported to be killing trees in Sullivan County, Pennsylvania, and occurred also in other parts of the State. Root knot (Heterodera marioni) was observed on willow in Mississippi. Stem blights due to Macrophoma sp. and Sphaeropsis salicis occurred in Texas. Root rot (Phymatotrichum omnivorum) was also reported from Texas, on weeping willow.

SCHINUS MOLLE. CALIFORNIA PEPPER TREE. Root knot (Heterodera marioni) was reported from Texas, and root rot (Phymatotrichum omnivorum) from Texas and Arizona.

SORBUS SPP. MOUNTAIN ASH. Blight (Bacillus amylovorus) was observed on S. americana in New Jersey and on S. aucuparia in New York. In New York it was more prevalent than it usually is on mountain ash. Canker due to Cytospora sp. was very common in Minneapolis and St. Paul, Minnesota, especially on young trees set out in the spring. Here again, drought favored attack by the fungus. Cytospora sp. in conjunction with the San Jose scale caused canker in Washington. C. massariana caused dying of the outer parts of practically all branches of a tree of S. americana observed in Twin Falls, Idaho. Rust (Gymnosporangium aurantiacum) was reported from Michigan on S. americana.

TILIA AMERICANA. AMERICAN LINDEN. Leaf spot (Phyllosticta tiliae) was reported from New Jersey, and root rot (Phymatotrichum omnivorum) from Texas.

ULMUS SPP. ELM. Dutch elm disease (Ceratostomella ulmi). Mr. R. Kent Beattie reports as follows on the Dutch elm disease: Centering around New York City, an entirely new and very serious infection of about 850 trees was discovered. Most of them were in New York and New Jersey, but 2 were in Connecticut. One infected tree was found in Cleveland, Ohio, and one in Baltimore, Maryland. In August it was discovered that the fungus was being introduced from Europe in burl elm logs imported for the cutting of fancy veneer. Consequently, elm trees in the vicinity of piers where such logs are landed, railroads transporting them, and veneer plants utilizing them may have been exposed to the disease.

Die back (Cephalosporium sp.) was reported from New Jersey, on U. americana. Leaf spot (Coniothyrium ulmi) was reported on Siberian elm from West Virginia. Previously it had only been known from Texas on U. campestris. Leaf spot (Didymosphaeria sp.) was reported from Texas on Chinese elm. Anthracnose (Gnomonia ulmea) was reported from several States. In Massachusetts, New York, New Jersey, Virginia, and Missouri it was said to be more prevalent than usual; in other States there was the usual amount. Nectria cinnabarina was observed on U. pumila in Connecticut. Canker caused by Phomopsis sp. was reported from Wisconsin on Chinese elm. Root rot (Phytophthora omnivorum) was noted on Chinese elm in Texas and Arizona, and in Texas also on the American elm. Pleurotus sapidus was the cause of wood rot of a living American elm in Connecticut. Sacidium ulmigallae was reported on Chinese elm in Texas. Canker or wilt caused by Sphaeropsis sp. has been of some importance in Wisconsin, but roguing in nurseries is checking its spread. Sphaeropsis malorum caused canker of U. pumila in Connecticut. Verticillium wilt of American elm was reported from Ohio (V. albo-atrum), and New Jersey (V. dahliae). Chlorosis, apparently due to a virus, was reported from New Jersey and Massachusetts.

GINKGOALES

GINKGO BILOBA. MAIDENHAIR-TREE. Root knot (Heterodera marioni) was reported from Mississippi. This is a new host for the root-knot nematode.

CONIFERS

WHITE PINE BLISTER RUST. The following statement on the status of the white pine blister rust due to Cronartium ribicola has been furnished by J. F. Martin, of the Division of Plant Disease Eradication and Control, Bureau of Entomology:

Control of the Disease: During 1933 the program to control the white pine blister rust on pine-producing areas in the United States was greatly benefited by the results achieved under the National Industrial Recovery Act and the Civilian Conservation Corps. A tentative summary of the control work performed under these two emergency programs shows that 673,376 acres of land were cleared of 59,352,202 Ribes by 399,774 man days

RANGE OF WHITE PINE AND BLISTER RUST
IN UNITED STATES
1933

DISTRIBUTION OF WHITE PINE

LEGEND
■ (In the East) *Pinus strobus*
■ (In the West) *P. monticola*, *P. lambertiana*,
P. albicaulis, *P. flexilis*, *P. aristata*,
P. balfouriana.

BLISTER RUST

SCALE OF MILES
0 300

BY W.H. LAMB
FOREST SERVICE
1918

Fig. 21. Range of white pines and of blister rust in the United States, 1933. (Map supplied by J. F. Martin).

of labor. The number of men varied from day to day, but when field activity under these programs reached its peak, there were 13,401 laborers, foremen, and checkers on this work. In addition, the regular blister-rust-control program that is carried on annually in cooperation with the affected States and other agencies resulted in the eradication of 9,197,819 Ribes from 332,687 acres of pine land with 51,843 man days of labor.

Spread of the Disease: Since the spread of this disease is influenced by local climatic conditions, host plant associations, and other factors, it is discussed separately for each of the principal white pine regions of the country.

Northeastern Region: Blister Rust and Ribes are generally distributed throughout this region, and diseased white pines (*Pinus strobus*) occur in more or less abundance in the different townships. Each year the production and dissemination of enormous numbers of aeciospores causes widespread infection on Ribes and any white pines growing in proximity to these bushes are exposed to infection. In time, these pines become diseased and as long as the two host plants remain near each other, the rust spreads back and forth, damage accumulates on the pines, and ultimately they are killed. Under such conditions the white pines cannot survive unless the Ribes are eradicated. The removal of these bushes in pine-producing areas will establish control of the disease and it can then be maintained by periodic inspection and reworking of these areas to prevent their repopulation with Ribes.

In the establishment and maintenance of control conditions on pine-producing areas in the Northeastern region, over 100 million Ribes have been destroyed on about 10,000,000 acres of land. The elimination of this large number of Ribes from millions of acres of pine-producing land has had a marked effect in checking the spread of the disease and preventing damage to white pines. Careful inspection of areas that have been eradicated of Ribes show but few cankers originating since the bushes were removed while in similar uneradicated areas they are plentiful. Old cankers are numerous because it has been possible to work only a portion of the white pine acreage each year, and meanwhile infections take place on the pines in the unworked portions. Prevention of the continued serious spread of the disease and resultant damage is an accomplished fact on those areas on which Ribes have been eradicated, but in this region there are still many pine areas awaiting the application of control measures. Also to keep the disease under control on protected areas and derive the full benefit of the work already done, it is necessary to re-work them periodically to eradicate missed bushes, sprouts, and those that develop from seed.

Ribes infection was more or less general throughout the New England States, New York, Pennsylvania, and New Jersey in 1933. A large number of *Ribes nigrum* were eradicated in New York and these plants were heavily infected with the rust. Following a period of dry weather, partial, and in some cases, complete defoliation of Ribes became very noticeable during

the latter part of July and the first part of August, particularly in Vermont, northeastern New York, and central and northern New Hampshire. Rains in the late summer aided the development of a new crop of Ribes leaves in many instances and these were frequently found infected with blister rust.

Southern Appalachian Region: In this region blister rust was found for the first time in additional counties in Maryland, Virginia, and West Virginia. Several diseased *Ribes rotundifolium* were located near Oakland, Garrett County, Maryland. In West Virginia, a single plant of this same species was found diseased about 12 miles north of Huntersville in Pocahontas County. Infected white pines were found for the first time in three places in the North River Valley, Augusta County, Virginia. These pine infection centers are in the George Washington National Forest. One of them covered 1-1/2 acres, with 23 out of 40 white pines, or 58 per cent, infected with blister rust. On this particular area the infection appears to have first occurred on the pine in 1924. There were 11 *R. cynosbati* bushes on the area and these were infected. Also, the rust was found on white pine and Ribes in Madison County along Skyline Drive in the proposed Shenandoah National Park. These discoveries show that the rust is gradually spreading southward and that as early as 1924 it became established on pine in Virginia.

North Central and Lake Region: In this region the rust was discovered in counties not previously known to be infected. Only a very small area remains in the white pine section of the three Lake States in which diseased pines or Ribes have not been found. In Upper Michigan two pine infection centers were found for the first time in Houghton County, where cultivated black currants are very extensively planted and heavily infected annually. In Marquette County the known range of pine infection was extended about 10 miles eastward and is now near the city of Marquette. A new center of blister rust infection on white pines was found near Iron Mountain in Dickinson County. Approximately 30 to 50 per cent of the white pines on a 17-acre tract were infected. Analysis of cankers showed that a severe wave of infection took place in 1927. Ribes infection was found for the first time in Schoolcraft County. Infection on *R. nigrum* was found particularly heavy near the city of Manistique where 400 of the 500 bushes destroyed were diseased. In Lower Michigan no severe outbreak of blister rust on pines has been discovered, but Ribes infection was found for the first time in Crawford County.

In Wisconsin pine infection was found for the first time in Bayfield and Forest Counties and Ribes infection in Bayfield, Langlade, Vilas, and Oneida Counties. The total number of infected counties is now 36, in 19 of which Ribes have been found diseased, while pine and Ribes have been found infected in 17 counties.

In Minnesota pine infection was reported for the first time in Carleton, Cook, Cass, and Beltrami Counties. On Ribes, the rust was found for the first time in Becker and Clearwater Counties. In addition new pine and Ribes infection centers were found in several counties previously reported as infected. The white pine on the infection area found in Cook County

was severely damaged. About 60 per cent of the trees were infected on approximately 10 acres of well stocked white pine, and many of the trees were dead or dying. This infection was found near Caribou Creek on the Superior National Forest and the diseased trees were immediately destroyed. Infection probably originated on this area about 1920 or 1921.

Although a considerable amount of scouting was done in Ohio, Indiana, Illinois, and Iowa, no infection was found except on cultivated black currants, R. nigrum, in Ashtabula County, Ohio.

Northwestern Region:

Inland Empire -(Northeastern Washington, Northern Idaho and Northwestern Montana): An extremely critical situation exists in the western white pine belt of the Inland Empire because of the great economic importance of this species (Pinus monticola) and its high degree of susceptibility to the rust. Host-plant associations are so favorable for the rapid spread and intensification of the disease that the existence of the western white pine as a forest tree in this region is dependent upon the control of blister rust. Including the work done in 1933, about one-fifth of the control area has been given initial protection and control conditions must be established promptly on the remainder of the area to avoid tremendous losses. Efforts are centered on the control of the disease on an area of 3 million acres containing the best of the land and timber, and the making of this area safe for the continued production of white pine. Even in this restricted area more or less serious damage will occur, depending upon the rapidity with which control measures are applied.

During the past season many heavy centers of young infection on pine were observed in Idaho and some of the trees about 10 feet in height had 1,000 cankers, mostly of 1931 origin. An exceptionally extensive and severe pine infection was located on Brown's Creek about 7 miles south of Pierce, Idaho. In this area young trees were completely cankered over the needle-bearing portion of the trees at the time of exposure. Two major waves of infection were apparent, the latest occurring in 1931. A heavy storm which swept over this area in 1933, blew down a number of large trees 150 to 200 feet in height and 2 to 4 feet D. B. H. A careful examination of the crowns of these pines showed that enough cankers were distributed through their crowns to kill them ultimately. Another area of pine infection 2-1/2 miles in length was found on French Creek. A number of severely infected trees were found on this area with cankers of 1928 and 1931 origin. These observations show the severity with which the disease attacks the western white pine and indicates the destruction of this species that may be expected as the rust gains momentum on unprotected areas.

For several years it has been noted that the spread of the disease along the streams in this region has been quite general but undoubtedly 1933 has been very favorable for the infection of upland Ribes. The two major reasons for this appear to be:

(1) An usually large volume of aeciospores. A large portion of these came from 1930 origin cankers fruiting for the first time in 1933. These are very abundant as a result of the heavy production of aecia in 1930 from 1927 origin cankers which were formed in the first major wave of infection after the rust reached this region in 1923. In tabular form the progressive spread of the rust appears to be as follows:

1923. Year the disease reached the Inland Empire.

1926-27. First and second aecial production from 1923 origin cankers.

Since 1927 was an exceptionally favorable year for rust development, very many new cankers were formed.

1930. First aecial production from the large number of 1927 origin cankers and a general spread to Ribes.

1933. First aecial production from the tremendous number of 1930 origin cankers. Also heavy production by all other aecia-producing cankers that were formed in the years 1923 and 1926-1929.

(2) Favorable weather conditions for Ribes infection in June, August, and September, although the usual early-season development in May and the first part of June was lacking this year.

There were 13 additional pine infection centers discovered in the Inland Empire region in 1933 as follows:

Place	Number of Pine Infection Centers
Coeur d'Alene National Forest.	1
St. Joe National Forest.	2
Clearwater National Forest	1
Potlatch Timber Protective Association	3
Clearwater Timber Protective Assn.	6
Total.	13

Oregon: Three new centers of infection were found in Oregon at widely separated points as follows:

Ribes Infection:

(1) Headwaters of the John Day River on Ribes petiolare near Austin (T.11S., R.35 E.) approximately 150 miles east of Mt. Jefferson.

(2) Headwaters of the Deschutes River on Ribes petiolare near Lava Lake (T.19 S., R. 8 E.) about 50 miles southeast of Mt. Jefferson.

Pine Infection:

- (1) Mt. Bohemia (T.23 S., R. 1 E.) at the headwaters of the Umpqua River flowing south and west, on western white pine, about 90 miles southeast of Mt. Jefferson.

The finding of these three infection centers is of special significance and importance. The first one is on the east side of the Cascade Mountains. This indicates the rust can, and probably is, advancing southward toward the sugar pine belt of California by two routes, the inland route east of the Cascades and the coast route west of the Cascades. The other two centers are reminders that the rust is advancing southward in Oregon. The Mt. Bohemia pine infection center which originated about 1927 is evidence of the fact that 6 years ago the rust was established on pine within 110 miles of the Oregon-California line.

ABIES SPP. FIR. Root rot (Armillaria mellea), rust (Melampsorella cerastii), and heart rot (Polyporus balsameus and Foria subacida), were reported from Minnesota on A. balsamea. The heart rot is common in all stands of balsam fir, especially where the trees are over mature.

CRYPTOMERIA SPF. Blight (Phomopsis sp.) caused marked injury to C. japonica in several Long Island Nurseries. It can be controlled by sanitation and Bordeaux. Leaf spot (Pestalozzia funerea) was noted on C. lobbii in New Jersey.

LARIX LARICINA. AMERICAN LARCH. Root rot caused by Polyporus schweinitzii was found in a swamp near Minneapolis, Minnesota. Seventy-five per cent of the trees were infected and severely rotted.

PICEA SPP. SPRUCE. Canker caused by Cytospora sp. was reported from Ohio, on Koster's blue spruce (P. pungens kosteri) from Massachusetts and New York, and on Norway spruce (P. excelsa) from New Jersey. In New York it is becoming more prevalent and serious each year, especially in the southern part of the State. A canker of blue spruce, cause undetermined, was also reported from Connecticut. Needle rust (Chrysomyxa cassandrae) was reported on P. mariana from Wisconsin. Chrysomyxa sp. was found, principally in or around the margins of swamps, on P. mariana and P. canadensis in Minnesota. Root rot caused by Polyporus schweinitzii occurs on P. mariana in Minnesota, especially on trees along drainage ditches where growth conditions have been changed considerably. Also reported from Minnesota were witches' broom of P. mariana due to Razoumofskya pusilla which is found wherever the host grows in the northern part of the State, and heart rot of P. mariana and P. canadensis caused by Trametes pini which occurs in all mature and overmature stands in northern Minnesota.

PINUS SPP. PINE. Rusts. Coleosporium ipomoeae was reported from Mississippi. C. solidaginis was reported from New Jersey, from Minnesota on P. banksiana, and from Connecticut on P. resinosa. Severe infection with C. vernaiae (C. carneum) occurred on several trees of P. nigra.

in an ornamental planting in Cincinnati, Ohio. Western gall rust, Cronartium coleosporioides (C. harknessii), was reported on P. ponderosa from Washington. C. comandrae, C. comptoniae, and C. quercuum were reported on P. banksiana from Minnesota, the last-named species also on the same host from Wisconsin, and on P. rigida from Connecticut. For Cronartium ribicola see p. 70.

Cankers. Atropellis pinicola was very common in northeastern Georgia, according to J. H. Miller, on P. echinata, P. taeda, P. virginiana. Curtis May reported it from Ohio on P. sylvestris, and stated that cankers, mostly young, had also been found on native pines. Mr. J. D. Diller found pine canker to be widespread from Virginia to Florida, occurring on Pinus echinata, P. resinosa, P. taeda, P. virginiana, P. rigida, P. sylvestris, P. pungens, P. austriaca, and P. densiflora in Virginia; on P. echinata, P. taeda, P. virginiana, P. sylvestris, P. austriaca, P. rigida, P. densiflora, and P. pinaster in North Carolina; and P. echinata, P. taeda and P. virginiana in Georgia; on P. echinata, P. virginiana, and P. taeda in Tennessee; and on P. caribaea, P. clausa and P. pinaster in Florida. F. C. Strong reported that Dasyscypha fuscosanguinea occurs in the Keweenaw Peninsula of the Upper Peninsula of Michigan, where it has spread somewhat and appears to be aggressive.

Tip blight, die back. Sphaeropsis ellissii was reported from New Jersey. S. malorum and winter injury or drought affected P. nigra in Connecticut.

Root rots caused by Armillaria mellea and Polyporus schweinitzii were reported from Minnesota, both affecting P. banksiana, P. resinosa, and P. strobus. Mature and overmature stands of P. resinosa are suffering considerable damage from Armillaria in the northern part of the State. As with other hosts, drought-weakened trees are attacked most severely.

Heart rot due to Trametes pini was reported from Connecticut on a living tree of P. strobus, and from Minnesota on P. banksiana, P. resinosa, and P. strobus.

Sooty mold (Capnodium pini) was reported on P. strobus from Connecticut. Leaf cast (Lophodermium pinastri) causes considerable defoliation and growth retardation of introduced western pines in Ohio. P. Murrayana, the lodgepole pine, was mentioned as susceptible. The disease was also reported from New Jersey. Leaf spot (Septoria acicola) was very severe on P. sylvestris in one Ohio nursery. P. murrayana and T. nigra poiretiana were also said to be susceptible in Ohio. The non-parasitic needle blight of P. strobus was reported only from Connecticut, although it probably occurred in other States.

SEEDLING DISEASE. Thelephora laciniata was reported on conifer seedlings in Ohio.

THUJA SPP. ARBORVITAE. Root rot (Armillaria mellea) was reported from Mississippi.

TSUGA CANADENSIS. CANADA HEMLOCK. The rusts Melampsora abietis-canadensis and Pucciniastrum myrtilli (Peridermium peckii) were reported from Connecticut.

DISEASES OF ORNAMENTALS

ROOT AND CROWN ROT (Sclerotium, reported as S. delphinii, except where noted otherwise), was reported on numerous hosts as follows:

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| ACONITUM SP., Connecticut. | IRIS SPP., Missouri (both <u>S. delphinii</u> and <u>S. rolfsii</u>). |
| A. NAPELLUS, New Jersey. | I. CRISTATA, Connecticut. |
| AJUGA REPTANS, New Jersey. | I. SIBIRICA, Massachusetts. |
| ANEMONE CHINENSIS, Massachusetts. | LILIUM SPP., Mississippi (<u>S. rolfsii</u>) |
| ANTIRRHINUM MAJUS, Texas (<u>S. rolfsii</u>). | LOBELIA SP., New Jersey. |
| AQUILEGIA SP., Delaware. | PENTSTEMON SP., Massachusetts. |
| CALENDULA SP., Texas (<u>S. rolfsii</u>). | PENTSTEMON BARBATUS (<u>Chelone barbata</u>), New Jersey. |
| CAMPANULA MEDIUM, New Jersey. | PHLOX SPP., New Jersey. |
| DAHLIA VARIABILIS, New Jersey. | RUDBECKIA, New Jersey. |
| DELPHINIUM SPP., Connecticut, New Jersey, New York, North Carolina (<u>Sclerotium</u> sp.), Texas (<u>S. rolfsii</u>), Arkansas (<u>Sclerotium</u> sp.), Michigan, (<u>Sclerotium</u> sp.), Missouri. | STEVIA SP., New Jersey. |
| EUPATORIUM SP., New Jersey. | TULIPA SPP., Connecticut. |
| VERONICA FILIFORMIS, Connecticut. | |
| V. REPENS, New Jersey. | |

ROOT FNOT (Heterodera marioni) was reported on the following hosts:

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| ABELIA, Mississippi. | CLEMATIS SP., New Jersey. |
| ALTHAEA ROSEA, Texas. | CONVOLVULUS JAPONICUS, District of Columbia. |
| ANTIRRHINUM MAJUS, Texas. | CUPHEA PLATYCENTRA, District of Columbia. |
| BEGONIA SPP., Connecticut, Texas, Missouri. | CYDONIA JAPONICA, Texas. |
| BROWALLIA VIScosa, District of Columbia. | DAHLIA, Mississippi. |
| CASSIA ARTEMESIOIDES, Texas. | DELPHINIUM ELATUM hybrid, Virginia. |

GARDENIA FLORIDA, New Jersey.	PHLOX DRUMMONDI, District of Columbia
GLADIOLUS, becoming a serious menace in eastern North Carolina.	ROSA spp., Texas
IRESINE LINDENI, District of Columbia.	SANSEVIERIA ZEYLANICA LAURENTII, Florida.
IRIS TINGITANA var. Wedgewood, North Carolina.	SOLANUM CAPSICASTRUM, District of Columbia.
LATHYRUS ODORATUS, Texas.	TORENIA FOURNIERI, District of Columbia.
LIGUSTRUM SP., Mississippi.	TRADESCANTIA FLUMINENSIS, Texas.
PAEONIA, New Jersey, Mississippi, increasing in commercial plantings in Michigan, Wisconsin, 3 per cent loss in Missouri.	VERBENA LUMINOSA, District of Columbia.
PERISTROPHE ANGUSTIFOLIA, District of Columbia.	VIBURNUM SP., Mississippi.
WEIGELA SP., Mississippi.	
AGERATUM. Rust (<u>Puccinia conocephalii</u>), Mississippi.	

ALTHAEA ROSEA. HOLLYHOCK. Bacterial soft rot of roots and stems, West Virginia. Leaf spot (Cercospora althaeina), Connecticut. Anthracnose (Colletotrichum sp.), New Jersey. Leaf spot (Phyllosticta althaeina), New Jersey. Root rot (Phymatotrichum omnivorum), Texas. Rust (Puccinia heterospora), Texas. Rust (Puccinia malvacearum) was widely reported as usual. It was said to be severe in Massachusetts and Virginia. In Michigan, according to Nelson, there was much less rust in 1933 than there had been for the past 5 years.

AZELANCHIER SP. JUNEBERRY. Blight (Bacillus amylovorus), North Dakota.

AMPELOPSIS SP. Leaf spot (Cercospora sp.), New Jersey.

AMPELOPSIS QUINQUEFOLIA. VIRGINIA CREEPER. Dieback (Cladosprium sp.) New Jersey. Leaf spot (Guignardia bidwellii) Wisconsin, on A. quinquefolia engelmanni.

AMPELOPSIS TRICUSPIDATA. JAPANESE CREEPER. Leaf spot (Guignardia bidwellii) was more common than usual in New York. It was also reported from New Jersey.

AMYGDALUS SP. FLORWERING PEACH. Leaf curl (Exoascus deformans) Mississippi. Brown rot (Sclerotinia sp.), New York.

ANEMONE SP. Crown rot (Botrytis, cinerea type), Pennsylvania. Leaf spot (Gloeosporium sp.), New York.

ANTIRRHINUM MAJUS. SNAPDRAGON. Anthracnose (Colletotrichum antirrhini) was found in one garden in Baton Rouge, Louisiana, and was reported from four counties in Missouri. Stem rot (Phyllosticta antirrhini) was common as usual in greenhouses in Massachusetts but caused little damage. Root rot (Phytophthora omnivorum), Texas. Rust (Puccinia antirrhini) was reported from New England, New York, New Jersey, Alabama, Texas, Michigan, Wisconsin, Minnesota, Missouri, and Kansas. Losses estimated were 1 per cent in Massachusetts and 2 per cent in Texas and Missouri. Nelson in Michigan reported that summer night temperatures were above normal and the disease did not increase until late September. Verticillium wilt was reported from Maine to New Jersey. The species was said to be Verticillium alboastrum in Massachusetts and Connecticut and V. dahliae in New Jersey. In Massachusetts wilt occurred in most outdoor plantings and caused damage to some greenhouse crops, resulting in a loss of 2 per cent. In the two cases observed in New York the disease caused very serious losses.

AQUILEGIA SPP. COLUMbine. Powdery mildew (Erysiphe polygoni), heavy infection late in the season in one locality in Minnesota. Stem rot (Sclerotinia sclerotiorum), abundant in Ohio.

ASPARAGUS PLUMOSUS. FERN ASPARAGUS. Blight (Ascochyta asparagina), Texas. Blight (fungi and weather) Florida.

ASPIDISTRA LURIDA. A disease showing many of the characteristics of ring spot was reported from New Jersey.

ASPLENIUM NIDUS. BIRDS NEST FERN. Nematode (Aphelenchoides fragariae Aphelenchus olesistus), New Jersey.

AUCUBA JAPONICA AUREA. Black leaf (Gloeosporium sp.), New Jersey.

AZALEA SPP. Mold (Botrytis sp., cinerea type), New Jersey, on A. pontica in greenhouse. Gall (Exobasidium oxyccoci), New Jersey, on A. indica. Leaf gall (Exobasidium vaccinii), Mississippi. Wilt (Fusarium sp. isolated from discolored vascular system), New Jersey. Powdery mildew (Microsphaera alni), New Jersey. Phoma sp., Texas. Rust (Pucciniastrum sp.), New Jersey. Rust (Pucciniastrum myrtilli), Connecticut on A. viscosa. Leaf scorch (Septoria azaleae), New Jersey. Practically all the indica types are susceptible to this disease. Azalea hinodegiri and Azalea var. Mme. Petrick are very susceptible. Bud rot (Sporocybe azaleae), Massachusetts.

BEGONIA SPP. Nematode leaf spot (Aphelenchoides fragariae) was less prevalent than usual in New York. It usually causes much trouble on the varieties Lady Mac and Melior being grown for Christmas. It was also reported from New Jersey on the variety Melior, and from Pennsylvania. Blight (Botrytis sp.) was serious in one greenhouse in Missouri. Leaf spot (Cercospora sp.), New Jersey. Anthracnose (Gloeosporium sp.), Texas. Root rot (Rhizoctonia solani), New Jersey. Root rot (various organisms), Mississippi.

BERBERIS THUNBERGII. JAPANESE BARBERRY. Wilt (Verticillium dahliae), New Jersey.

BUXUS SPP. BOX. Colletotrichum sp., Macrophoma candollei, Nectria sp., Phoma conidiogena, Phomopsis sp., Phytophthora parasitica, Verticillium buxi, and Volutella buxi were reported from the District of Columbia on B. sempervirens and B. suffruticosa, and Fusarium redolens, F. solani, F. semitectum majus and Nectria (Nectriella) rousseliana on B. sempervirens (PDR 17:169-170).

BUXUS SEMIERYRENS. COMMON BOX. (See also Buxus spp.). Leaf spot (Macrophoma candollei), Connecticut, New Jersey. Canker and blight (Nectria rousseliana /Volutella buxi/) is common in New York wherever the host is hardy and is apparently becoming more prevalent and serious. It was reported also from Connecticut, New Jersey, Maryland, and South Carolina. Leaf spot (Phoma conidiogena), New Jersey. Winter injury caused considerable damage in Virginia.

CACTUS. Root rot (Fusarium sp.), Mississippi. Charcoal spot (Gloeosporium lunatum), scorch (Hendersonia opuntiae), and root rot (Phymatotrichum omnivorum), were reported from Texas.

CALATHEA SANDERIANA (Maranta sanderiana). Leaf spot (Phyllosticta sp.), New Jersey.

CALCEOLARIA SP. Stem rot (Sclerotinia sclerotiorum), Washington, in greenhouse.

CALENDULA OFFICINALIS. Stem rot (Rhizoctonia solani) of greenhouse plants, New Jersey. Drop (Sclerotinia sclerotiorum), Texas. Yellows (virus), Maine, and New York.

CALLISTEPHUS CHINENSIS. CHINA ASTER. Rust (Coleosporium solidaginis) is very prevalent and serious in northern New York State, but is of no importance in the southern part. In 1931 there was more than usual. Rust was also reported from New Jersey and Wisconsin.

Wilt (Fusarium conglomerans callistephi) was reported from Maine, New York, New Jersey, Mississippi, Ohio, Michigan, Wisconsin, Missouri, North Dakota, and Washington. The disease was local in occurrence in most States. In New York losses were rather severe with ordinary commercial varieties, but many florists obtained excellent results from wilt-resistant strains. Michigan reported more wilt than usual. It occurred in most plantings observed, the fungus being apparently introduced with the seed in most cases. In Wisconsin there was said to be much more than usual.

Stem canker (Phomopsis callistephi) was less prevalent than usual in Wisconsin. It is confined to asters grown under cloth shade. Stem rot (Rhizoctonia solani), New Jersey. Leaf spot (Septoria callistephi), Missouri.

Yellows (Virus) was much more prevalent than usual in Massachusetts. Very few plants survived to produce blossoms. In New York many growers are using insect-proof cloth tents to control the disease. In Michigan it continues to be the most serious disease of asters. In 1933, although more prevalent than usual, it was not so severe as in 1932, apparently because leafhoppers were less abundant. Fewer asters are grown in Michigan now than five years ago because of the persistent seriousness of yellows. New York and Ohio reported the usual amount, and Wisconsin much less than usual. It was also reported from Maine and Connecticut.

CAMELLIA JAPONICA. CAMELLIA. Leaf spot, Festalozzia sp., Virginia, South Carolina, in both cases probably followed frost injury. Festalozzia guepini occurred in New Jersey and Mississippi. In New Jersey in one case this organism seemed to be the primary cause; in others it was associated with Gloeosporium sp. and Macrosporium sp.

CAMELLIA SASANQUA. SASANQUA TEA. Exobasidium monosporum, Alabama (P.D.R. 44).

CENTAUREA CYANUS. CORNFLOWER. Rust (Puccinia cyani), Connecticut, New Jersey, Pennsylvania.

CHRYSANTHEMUM SP. PYRETHRUM. Wilt (Rhizoctonia sp.), Puerto Rico.

CHRYSANTHEMUM HORTORUM. CHRYSANTHEMUM. Crown gall (Bacterium tumefaciens), Texas. Leaf spot (Cercospora sp.), Texas. Dodder (Cuscuta sp.) in two instances caused serious injury to out-of-doors plants in New York. The parasitized plants were severely stunted and sometimes killed. Powdery mildew (Erysiphe cichoracearum) was less prevalent in New York, both under glass and outdoors. It was also reported from New Jersey (as Oidium sp.). Wilt (Fusarium sp.), New Jersey. Root rot (Phymatotrichum omnivorum), Texas. Rhizoctonia (probably R. solani), Texas, Arizona. Leaf spot (Septoria chrysanthemella), New Jersey. Wilt (Verticillium dahliae) in two places in Washington. Yellows (virus), Mississippi.

CIBOTIUM SCHIEDEI. TREE FERN. Blight (Pestalozzia sp.), New Jersey.

CITRUS TAITENSIS. TAHITI ORANGE. Wither tip (Colletotrichum gloeosporioides), New Jersey.

CODIAEUM SPP. CROTON. Leaf spot (Gloeosporium crotonis), New Jersey. The varieties Pere Cheron and Rothschild are very susceptible.

COLEUS SPP. Bacterial leaf spot was reported from New Jersey.

CORDYLINE TERMINALIS. COMMON DRACAENA. Leaf spot (Phyllosticta maculicola), New Jersey. Root rot (Phytophthora sp.), New Jersey.

COREOPSIS SP. Stem rot (Sclerotinia sclerotiorum) was abundant on Coreopsis in Ohio and was reported from Washington on Calliopsis (Coreopsis tinctoria).

CORNUS FLORIDA. FLOWERING DOGWOOD. Leaf spot (Phyllosticta sp.) and twig blight (Sphaeropsis sp.), New Jersey.

COSMOS BIPINNATUS. COSMOS. Blight (Phomopsis stewartii) was less prevalent in Kansas than in moister seasons, although it was severe on some plants. Root rots (Phymatotrichum omnivorum and Rhizoctonia sp.), Texas. Mosaic (virus), Texas.

COSMOS SULPHUREUS. YELLOW COSMOS. Root rot (Phymatotrichum omnivorum), Texas.

COTONEASTER SPP. Blight (Bacillus amylovorus), New Jersey, Texas (on C. pannosa), Ohio (on C. divaricata and C. foveolata), California. Twig blight (Diplodia sp.), Texas. Root rot (Phymatotrichum omnivorum), Texas, Arizona. Twig blight (Sphaeropsis malorum), New York, Texas.

CRASSULA FALCATA. Anthracnose (Gloeosporium sp.), New Jersey.

CYCLAMEN SPP. Bud rot (Botrytis sp.) was reported very troublesome by a grower of cyclamen seed in Michigan, according to Nelson. Blight (Botrytis sp., cinerea type) and stunt (Cladosporium cyclaminis), reported on Cyclamen persicum in New Jersey.

DAHLIA SPP. Leaf spot (Alternaria sp.), New Jersey. Bacterial wilt (Bacterium solanacearum), Mississippi. Storage rot (Botrytis, cinerea type), New Jersey. Leaf spot (Cercospora sp.), Mississippi. Powdery mildew, reported as Erysiphe cichoracearum, Connecticut; reported as E. polygoni, New Jersey, Missouri. Root rot (Fusarium sp.), New Hampshire. Root rot (Phymatotrichum omnivorum), Texas. Wilt (Verticillium dahliae) caused 0.5 per cent loss in Missouri. Mosaic (virus), New York, New Jersey, Wisconsin. Few commercial plantings in New York, if any, are free from mosaic. Stunt (virus), Virginia, 1 per cent loss in Missouri.

DELPHINIUM SPP. LARKSPUR. Bacterial leaf spot, black spot (Bacterium delphinii) was reported from Maine, Massachusetts (10 per cent loss estimated), Connecticut, New York (less prevalent than usual), New Jersey, Delaware (much more than usual), Pennsylvania, Wisconsin, and Minnesota. Blight, bud rot (Botrytis sp.), Massachusetts, Wisconsin. Root rot (Corticium vagum), Mississippi. Powdery mildew, Maine; reported as Erysiphe cichoracearum, Minnesota; as E. polygoni, New Hampshire, New York. Root rot (Phymatotrichum omnivorum), Texas. Root rot (Rhizoctonia and Fusarium), Massachusetts, very prevalent. Stem rot (Sclerotinia sclerotiorum and Sclerotium sp.) was more prevalent than usual in Michigan, the increase being attributed to excess precipitation in May. Sclerotinia sclerotiorum was abundant in Ohio also. Stunt or witches' broom (virus), Idaho (1932), Washington.

DIANTHERA SP. WATER WILLOW. Bagnisiella dianthrae, Texas.

DIANTHUS SP. PINK. Smut (Ustilago violacea), New Jersey.

DIANTHUS BARBATUS. SWEET WILLIAM. Stem rot (Rhizoctonia sp.) Connecticut.

DIANTHUS CARYOPHYLLUS. CARNATION. Leaf spot (Alternaria sp.), Missouri (of slight importance). Branch rot, leaf spot, crown rot (Alternaria dianthi): The leaf spot was reported from New Jersey. Branch rot was found in two greenhouses in Missouri for the first time in 1932, and occurred again in 1933. Crown rot was reported from Texas. Bacterial leaf spot (Bacterium woodsii), New Jersey, New York. In New York it occurs mostly on Long Island. With a few exceptions most commercial ranges were free from the disease in 1933. The varieties Matchless, Red Matchless, Scepter, and Potentate are very susceptible, according to C. Guterman. Bud blight (Botrytis sp.), New Jersey. Stem rot (Corticium vagum) was general but less prevalent than usual in New York. It is usually most serious just after the plants have been benched. The variety Matchless is very susceptible. In Missouri, where there was more than usual, a loss of 3 per cent was estimated, mostly in greenhouses. It was reported also from Kansas and Texas. Fairy ring (Heterosporium echinulatum), Washington, in two localities. Rust (Uromyces caryophyllinus) is widespread, but in 1933 it was reported only from Massachusetts, New Jersey, and Missouri. Two per cent loss was estimated in Missouri.

DICENTRA SPECTABILIS: BLENDING HEART. Wilt (Fusarium sp.), New Jersey.

DIGITALIS PURPUREA. COMMON FOXGLOVE. Stem rot (Rhizoctonia solani), New Jersey.

DRACAENA FRAGRANS. DRACAENA. Tip blight (Gloeosporium sp.), New Jersey.

DUCHESNEA INDICA. MOCK STRAWBERRY. Rust (Frommea obtusa duchesneae [Frommea duchesneae, Kuehneola duchesneae]), Virginia.

ERYTHRINA ARBOREA. CORAL BEAN. Root rot (Phymatotrichum omnivorum), Texas.

EUGENIA APICULATA. SHORTLEAF EUGENIA. Brown rot (Botrytis sp., cineraea type), New Jersey.

EUONYMUS JAPONICUS. EVERGREEN BURNINGBUSH. Anthracnose (Colletotrichum griseum) and powdery mildew (Microsphaera alni) both reported from Mississippi.

EUPATORIUM SP. Stem rot (Rhizoctonia solani), New Jersey.

EUPHORBIA MARGINATA. SNOW-ON-THE-MOUNTAIN. Leaf spot (Phyllosticta sp.), New Jersey. Root rot (Phymatotrichum omnivorum), Texas.

FERNS. The slime mold Diachea leucopoda was fruiting on the lower portions of fronds in a greenhouse in New Jersey.

FICUS SPP. Gloeosporium elasticae on Ficus elastica, and Gloeosporium sp. on F. pandurata, New Jersey.

FREESIA SPP. Corm rot (Fusarium sp.), according to Freeman Weiss, occurs in greenhouses on Long Island, near Babylon, where it is increasing in importance. Leaf blight (Heterosporium sp.), Connecticut.

FUCHSIA SPP. Sooty mold (Fumago sp.), Washington.

GARDENIA FLORIDA. CAPE JASMINE. Canker (Myxosporium sp.?), New Jersey. Root rot (Phymatotrichum omnivorum), Texas. Cold injury, Mississippi.

GLADIOLUS. Bacterial blight (Bacterium gummisudans) was much more prevalent than usual in Minnesota. It caused as much as 30 per cent damage in the field on variety Betty Joy. In Missouri it was first found in 1932 in one planting; in 1933 it occurred in two plantings. Scab (Bacterium marginatum) was reported from Massachusetts, New York, New Jersey, Virginia, Florida, Mississippi, Texas, where it caused 10 per cent loss, Ohio, Michigan, Missouri, where a loss of 2 per cent was estimated, Kansas, and Washington. Corm rot (Fusarium sp.), Massachusetts, Mississippi, Wisconsin. Corm rot (Penicillium gladioli), Connecticut, New Jersey, Florida, Mississippi, Wisconsin, and Washington. Dry rot (Pythium sp.), Texas. Dry rot (Sclerotinia gladioli / Sclerotium gladioli), New Jersey, Michigan, Missouri. Hard rot (Septoria gladioli), New Jersey, Mississippi, Wisconsin.

HEDERA HELIX. ENGLISH IVY. Bacterial leaf spot (Bacterium hederae), New Jersey.

HELICHRYSUM SPP. EVERLASTING. Yellows (Virus), several reports in New York.

HOWEA FORSTERIANA (Kentia forsteriana). FORSTER PALM. Leaf blight (Colletotrichum kentiae), New Jersey.

HYDRANGEA SPP. Leaf spot (Alternaria sp.), powdery mildew (Oidium sp.), and leaf spot (Phyllosticta hydrangeae) were reported from New Jersey.

HIBISCUS SYRIACA. SHRUB ALTHEA. Root rot (Phymatotrichum omnivorum), Texas.

IRIS SPP. Stem and bulb nematode (Anguillulina dipsaci) was found in North Carolina on the bulbous iris, Iris tingitana var. Wedgewood, associated with the root knot nematode. Bacterial leaf blight (Bacillus

carotovorus?). There was only a trace of this leaf spotting in Massachusetts in 1933, according to Boyd, although it was not much drier in the spring than it was in 1932 when severe infection occurred in May, and although there was a considerable amount of typical bacterial soft rot in June. A bacterial leaf spot (undet.) was reported from Connecticut on I. cristata. Bacterial soft rot (Bacillus carotovorus) was reported as occurring in the usual amounts or less in Massachusetts, New York on German Iris, New Jersey, Pennsylvania, Mississippi, and Wisconsin. A bacterial decay following winter injury was reported from Washington.

Leaf spot (Didymellina iridis, D. macrospora /Heterosporium gracile/) was reported, mostly as of the usual prevalence or less, in Massachusetts, Connecticut (on Iris sp. and German iris), New York (on German iris), New Jersey, Virginia, Texas, Arkansas, Wisconsin, Minnesota, Missouri, Kansas, and Washington (on German iris). In Virginia it was prevalent and caused injury to many plantings. In Arkansas it was said to be very prevalent and destructive, especially in May, probably due to excessive rainfall. In Missouri, although plentiful, it does not seem to cause any permanent damage. In New York it was less serious in spite of a generally wet spring.

Dry rot (Fusarium sp.), Texas. Flower spot (Gloeosporium cingulatum), District of Columbia. Ink disease (Mystrosporium sp.) occurred on bulbous iris on the Eastern Shore of Virginia.

Rust (Puccinia iridis) was found on the rhizomatous species I. mariae and I. leichtlini and the bulbous species I. histrio, I. histrioides, and I. sindjarensis, imported into California from Holland. The native rhizomatous species, I. hexagona, was found infected in South Carolina. Commercial varieties of bulbous iris found infected include Golden King and White Excelsior in California, Anton Mauve, Hart Nibrig, and King of the Whites in Louisiana, and D. Haring, Leonardo de Vinci, and White Excelsior in North Carolina (this data on rust from Bureau Plant Quarantine News Letter, No. 30, p. 5, June, 1933). Rust was also reported from Missouri.

KALMIA SPP. KALMIA, MOUNTAIN LAUREL. On Kalmia sp.: Leaf spot (Septoria kalmicola), Virginia. On K. latifolia: Leaf spot (Cercospora kalmiae), Connecticut. Blight (Phomopsis kalmiae), New Jersey. Leaf spot (Phyllosticta kalmicola), Long Island, New Jersey, Pennsylvania.

KERRIA JAPONICA. KERRIA. Blight (Coccomyces kerriae), was so serious in a garden in Virginia as to necessitate cutting out of the plants. Leaf spot (Septoria sp.?), New Jersey.

LABURNUM VULGARE. GOLDENCHAIN. Fusicoccum kunzeanum (Diaporthe kunzeanum), Massachusetts.

LATHYRUS ODORATUS. SWEET PEA. Leaf spot (Alternaria sp.), New Jersey, Texas. Streak (Bacillus lathyri), Texas. Root rot (Corticium vagum, Rhizoctonia sp.), Mississippi, Texas, North Dakota, Washington. Wilt

(Fusarium sp.), New Jersey. Powdery mildew, cause not given, Maine; Microsphaera alni, New Jersey. Leaf spot (Ramularia sp.) was serious in one greenhouse in New York where it caused premature defoliation. The spots are irregular and gray brown, and the fungus fruits on both surfaces of the leaf. Root rots (various), Maine. Black root rot (Thielavia basi-cola) was reported once in Connecticut. In New York it caused severe damage in one greenhouse and a few cases were reported in out-of-doors plantings. Mosaic (virus) occurred in a few plantings in New York. In one greenhouse it was serious and caused marked stunting. Other States from which mosaic was reported are Maine, New Jersey, and Kansas.

LEUCOTHOE CATESBAEI. DROOPING LEUCOTHOE. Leaf spots due to Cercospora kalmiae and Cryptostictus sp. were reported from New Jersey.

LIATRIS SP. GAYFEATHER. Wilt caused by Verticillium dahliae was reported from New Jersey.

LIGUSTRUM SPP. PRIVET. Leaf spot (Cercospora sp.) Delaware, on L. vulgare. Leaf spot (Cercospora ligustri), Texas. Dodder (Cuscuta sp.) Texas. Anthracnose and blight (Glomerella cingulata) was reported from New York on L. vulgare. It is said to be decreasing in importance each year, due to the use of other, immune, varieties. Also in Texas. Root rot (Phymatotrichum omnivorum), Texas, Arizona.

LILIUM SPP. LILY. Stem rot (Botrytis sp. and Phytophthora cactorum) was more prevalent than usual in Wisconsin, perhaps due to wet weather in May. The Regal lily was said to be susceptible. Blight (Botrytis elliptica) was reported from New York, New Jersey, Michigan, and Oregon. In Oregon, due to cold wet weather during spring and early summer, it was so severe that some usually resistant kinds were attacked. In Michigan, on the other hand, some very susceptible kinds like L. candidum and L. testaceum were not affected because of very unfavorable temperatures. L. candidum, Madonna lily, and L. regale, the Regal lily, were mentioned as susceptible in New Jersey. Bulb rot (Fusarium sp., and Bacillus carotovorus) was very severe in gardens in Massachusetts. The Madonna lily was said to be susceptible. "Limber neck" (nonparasitic), Mississippi. Mosaic (virus) was serious in some species in Michigan and was also reported from Wisconsin.

LILIUM CANDIDUM. MADONNA LILY. Leaf mold (Botrytis sp.), Connecticut. Leaf scorch (high temperatures) caused serious damage in all parts of Michigan. The injury occurred during a period of very high temperatures in June. Stem rot (Rhizoctonia solani), Connecticut. Mosaic (virus), New Jersey. Yellow flat (virus), New Jersey, Pennsylvania.

LILIUM LONGIFLORUM. EASTER LILY. Blight (Botrytis elliptica), Florida. Mosaic (virus), Connecticut, Florida. Yellow flat (virus), New Jersey.

LILIUM SPECIOSUM. Mosaic (virus), New Jersey.

LUPINUS SPP. LUPINE. Ring spot (virus), Washington.

MAGNOLIA SPP. MAGNOLIA. Leaf spots (Alternaria sp. following mechanical injury, Heterosporium magnoliae and Pestalozzia guepini), Texas.

MAHONIA AQUIFOLIUM. OREGON HOLLYGRAPE. Leaf spot (Phyllosticta sp.), New Jersey.

MALUS SPP. FLOWERING CRAB. Gymnosporangium juniperi-virginianae was reported from Connecticut on Malus ioensis, from New York where it was rather severe on many susceptible ornamentals, from New Jersey on M. floribunda, and from Mississippi.

MATTHIOLA SPP. STOCK. Stem rot (Rhizoctonia solani), New Jersey, on M. incana. Root rot (Phymatotrichum omnivorum), Texas. A rather serious wilt, from which Verticillium sp. was isolated, was found twice in New York, in a garden and also under glass.

MIRABILIS JALAPA. FOUR O'CLOCK. Root rot (Phymatotrichum omnivorum), Texas.

MONARDA SPP. BEEBALM, BERGAMOT. Rust (Puccinia menthae) was reported from Connecticut, on M. didyma, M. didyma splendens, M. kalmiana, and M. ramaleyi.

NARCISSUS SPP. Stem and bulb nematode (Anguillulina dipsaci) was reported from New Hampshire, New Jersey, Michigan, Missouri, and California. In Michigan, according to Nelson, more specimens were sent in by State inspectors than in any previous season. In Missouri it was serious in one commercial planting. The Chinese sacred lily, Narcissus tazetta orientalis, usually seems to be immune but in a number of cases in San Diego, California, it was found to be infested (according to Bureau of Plant Quarantine News Letter, No. 29, p. 8, May, 1933). The nematode Aphelenchooides fragariae was found in two lots from North Carolina, (Bureau Plant Quarantine News Letter, No. 30, p. 5, June 1933). Basal rot (Fusarium sp.) was reported from New York, Florida, Mississippi, Wisconsin, and Missouri. A loss of 2 per cent was estimated in Missouri. On Long Island the Barrii and Leedsii varieties are said to be resistant, while Victoria, Emperor, and Eureka are very susceptible. Leaf scorch (Stagonospora curtisii) caused a loss of 20 per cent in some Long Island plantings. Varieties belonging to the large trumpet group are resistant to this disease, while the Barrii, and Jonquilla groups, etc., are very susceptible. Mosaic (virus), also known as gray disease, caused losses of as much as 30 per cent in some plantings on Long Island. It was reported from New Jersey, and from Missouri where the loss was estimated at 1 per cent.

NEMESIA SP. A bacterial leaf spot was reported from New Jersey.

NERINE SPP. Leaf scorch (Stagonospora curtisii) was found on badly diseased leaves of N. flexuosa alba, N. plantii, and the horticultural varieties Her Majesty and Robert Berkeley, from California. (Bureau

Plant Quarantine News Letter, No. 30, p. 5, June 1933).

NERIUM OLEANDER. OLEANDER. Root rot (Phymatotrichum omnivorum), Texas.

PACHYSANDRA TERMINALIS. JAPANESE PACHYSANDRA. Volutella sp. was reported on this host from Connecticut.

PAEONIA SPP. PEONY. Blight (Botrytis paeoniae) was reported from Massachusetts, Connecticut, New York, New Jersey, Mississippi, Ohio, Wisconsin, Minnesota, and Missouri. Blotch (Cladosporium paeoniae), New Jersey, Wisconsin, and Missouri. Crown elongation (undet.), Missouri. Crown rot (undet.), Kansas. Lemoine's disease (cause unknown) was observed on certain varieties in large commercial plantings in Michigan. Blight (Phytophthora cactorum) was reported from Wisconsin and Minnesota.

PELARGONIUM SPP. GERANIUM. Bacterial leaf spot (Bacterium pelargoni), and blight (Botrytis, cinerea type), were reported from New Jersey.

PETUNIA HYBRIDA. PETUNIA. Mosaic (virus), New Jersey, Kansas.

PHILADELPHUS SPP. MOCKORANGE. Rust (Gymnosporangium speciosum), Texas, on P. microphyllus.

PHLOX SPP. Stem nematode (Anguillulina dipsaci), New Jersey, and on Phlox subulata from the District of Columbia. Powdery mildew was reported from Maine and Texas; as Erysiphe cichoracearum from Connecticut, New York (rather general and serious), and New Jersey; and E. polygoni (E. communis) from Minnesota. Leaf spot (Septoria phlogis), on Phlox divaricata from New Jersey. Leaf spot and leaf wilt (undet.) Kansas.

PHOENIX CANARIENSIS. CANARY DATE PALM. Smut (Graphiola phoenicis), Pennsylvania.

PIERIS FLORIBUNDA. MOUNTAIN ANDROMEDA. Dieback (Phytophthora sp.), Pennsylvania.

PITTOSPORUM SPP. Leaf spot (Cercospora sp.), South Carolina, Texas. In South Carolina it apparently followed insect punctures.

POINSETTIA SPP. POINSETTIA. Root rot (Phymatotrichum omnivorum) and Rust (Uromyces proeminens), Texas.

POLEMONIUM REPTANS. CREEPING POLEMONIUM. Leaf spot (Septoria polemonii), Connecticut.

PYRACANTHA SPP. FIRETHORN. Scab (Fusicladium pyrinum var. pyracanthae) was reported on P. coccinea in Connecticut and on P. lalandi in the District of Columbia. Scab (Venturia sp.) was reported on P. coccinea from Washington.

RHODODENDRON SPP. RHODODENDRON. (See also Azalea). Leaf spot (Cercospora rhododendri), on R. ponticum in New Jersey. Anthracnose (Colletotrichum philodendri), on R. giganteum in New Jersey. Gall (Exobasidium sp.), Pennsylvania. Leaf mold and witches' broom (Exobasidium sp.), New Jersey. R. F. White remarks that there are three distinct species of Exobasidium on Rhododendron. This one forms a white felt of spores on the lower surfaces of the leaves, and the leaves turn yellow. A witches' broom is formed. Red leaf spot, yellow blight (Exobasidium vaccinii), Connecticut, on R. medicaulis, New Jersey. Leaf spot (Pestalozzia macrotricha), New Jersey. Canker (Phomopsis sp.), New Jersey, Pennsylvania, New York. Leaf spot (Phomopsis spp.), Connecticut. Leaf spot (Phyllosticta spp.), New Jersey. Leaf spot (Phyllosticta maxima) on R. carolinianum in Connecticut. Blight (Phytophthora cactorum), New Jersey. Wilt (Phytophthora cinnamomi), on R. ponticum in New Jersey. Root rot (Phytophthora cryptogea?), New Jersey, also isolated from a plant from Pennsylvania, according to R. P. White. Rust (Pucciniastrum myrtilli), on R. lutescens in Connecticut, on R. ponticum in New Jersey. Die back (Sphaeropsis sp.) on R. maximum in New Jersey, also determined by R. P. White on the same species from Pennsylvania.

RHUS COTINUS. COMMON SMOKE TREE. Wilt (Verticillium dahliae), New Jersey.

ROSA SPP. ROSE. Cankers. Coniothyrium and other fungi caused cankers in Florida. The occurrence of dead or cankered canes is apparently correlated with defoliation from black spot and with wounds made by pruning and blossom removal (W. B. Shippy). Limb canker (Coniothyrium rosarum) was reported from Texas. Canker due to Coryneum sp. was common in the Hood River Valley of Oregon, probably due to the severity of the preceding winter, according to J. R. Kienholz. Crown canker (Cylindrosporium scoparium) was reported from New Jersey. Brown canker caused by Diaporthe umbrina was reported from Massachusetts and New Jersey. Diplodia sp. was a cause of canker in Texas. Cane blight or canker due to Leptosphaeria coniothyrium (Coniothyrium fuckelii) caused losses estimated at 3 per cent in Massachusetts, 2 per cent in Texas, and 0.5 per cent in Missouri and was reported also from New Jersey and Mississippi. A die back and stem girdle of unknown cause was observed on hybrid teas and certain climbers in Arkansas.

Black spot (Diplocarpon rosae) was generally reported as an important disease, in most cases as of average prevalence. Delaware reported much more and Oregon more than usual, while Michigan, Missouri, and Kansas reported less. Losses estimated were 5 per cent in Texas, 1 per cent in Massachusetts, and 0.5 per cent in Missouri. In New York the disease was said to be serious, particularly on hybrid teas and perpetuals. In Wisconsin R. rugosa and its hybrids were resistant, while the Pernetiana varieties were susceptible. Copper fungicides, especially Bordeaux mixture, have been effective in control experiments in Florida.

Powdery mildew. Sphaerotheca humuli was reported from Washington. S.

pannosa was widespread, as usual. New Jersey was the only State reporting more than the average prevalence, while Connecticut, Arkansas, Michigan, Wisconsin, Missouri, and Kansas reported less. In Michigan the disease was said to be less prevalent than for several years. In other States reporting it occurred in the usual amounts. Massachusetts reported 5 per cent loss, Texas and Missouri 2 per cent.

Other diseases. Root rot (Armillaria mellea), Texas. A bacterial leaf spot was reported from one locality in New Jersey and one in New York, but has been seen in no other house (R. P. White). Crown gall (Bacterium tumefaciens) was reported from Connecticut, Texas, Arkansas, Wisconsin, Missouri, and Kansas. Bud blight (Botrytis sp., cinerea type), New Jersey, Texas. Leaf spot (Cercospora rosicola), Mississippi, Puerto Rico. Chlorosis due to excess of lime, Texas. Anthracnose (Gloeosporium rosae), Texas. Fhomopsis sp. was reported on R. rugosa from Connecticut. Rusts were reported as follows: Phragmidium spp. from Maine and Wisconsin, P. speciosum from Washington, and P. subcorticinum (P. rosae-pimpinellifoliae) from Connecticut, Texas, and Indiana. Leaf spot (Phyllosticta sp.), New Jersey. Root rot (Phyamatotrichum omnivorum) caused 6 per cent loss in Texas. Leaf spot (Septoria sp.), New Jersey. Anthracnose (Sphaceloma rosarum), Maryland, Virginia. Mosaic (virus) New Jersey.

ROSMARINUS OFFICINALIS. ROSEMARY. Root rot (Phyamatotrichum omnivorum), Arizona.

SCUTELLARIA spp. SKULLCAP. Stem rot (Botrytis sp.), Washington.

SPIRAEA spp. SPIREA. Bacterial leaf spot on Vanhoutte spirea, New Jersey. Chlorosis or variegation, Washington. Powdery mildew (Eodosphaera oxyacanthae), Connecticut. Root rot (Phyamatotrichum omnivorum), Texas.

SYMPHORICARPOS spp. SNOWBERRY. Anthracnose (Glomerella cingulata) was much more prevalent than usual in Massachusetts, due perhaps to late rains and warm weather. It was also reported from Wisconsin. Powdery mildew (Microsphaera sp.), New Jersey. Anthracnose (Sphaceloma symphoricarpi), on S. albus var. laevigatus, Maryland.

SYRINGA spp. LILAC. Bacterial blight (Bacterium syringae) was reported from Massachusetts, Connecticut, Alabama, Illinois, and Michigan. Excessive moisture in May favored the disease in Michigan and very general and heavy infection was observed on many varieties in commercial plantings where no attempt had been made to control it last year. The report from Alabama is apparently the first for that State. Leaf spot (Cercospora lilacis), Mississippi. Anthracnose (Gloeosporium syringae), Connecticut, new to the State. Graft canker (undet., possibly due to incompatibility between stock and scion), Tennessee. Powdery mildew (Microsphaera alni), Massachusetts, Connecticut, New Jersey, Texas, Wisconsin, Missouri, and Kansas. Massachusetts reported the least seen in years. In Wisconsin infection occurred later than usual due to lack of moisture. Leaf spot (Phoma sp.), Wisconsin. Root rot (Phyamatotrichum omnivorum), Texas. Blight (Phytophthora cactorum), New Jersey. Winter injury was reported

from Washington and frost injury from New Jersey.

TRACHYMENE CAERULEA. BLUE LACEFLOWER. Stem rot (*Rhizoctonia solani*), 100 per cent infection in one place in New Jersey.

TROPAEOLUM MAJUS. NASTURTIUM. Wilt (Bacterium solanacearum?), New Jersey.

TULIPA SPP. TULIP. Tulip fire, Botrytis blight (Botrytis tulipae) was reported from Massachusetts, Connecticut, New York, New Jersey, Virginia, Ohio, Michigan, Wisconsin, Missouri, and Washington. In almost every case it was said to be unusually destructive. In Massachusetts and Connecticut it was more severe than it had ever been observed to be previously. In Michigan practically all plantings more than two years old were seriously affected. According to Nelson the best control of this disease is obtained by replanting the bulbs annually in new locations. In Wisconsin it was especially severe in shady locations, according to Vaughan, who thought that the disease might be due, in part, to Phytophthora cactorum. Blue mold (Penicillium sp.), Washington. Gray bulb rot (Rhizoctonia tuliparum) was severe on one lot of bulbs for forcing imported into New Jersey from Holland.

VIOLA SPP. VIOLET. Leaf spots. Alternaria sp., Texas. Cercospora granuliformis, Virginia, on V. papilionacea. Cercospora violae, common late in the season in Georgia. Septoria hyalina, on V. primulifolia in South Carolina. An undetermined leaf spot was very severe in one garden in Kansas. Rust (Puccinia violae), Connecticut, on Viola sp. and V. odorata. Scab (Sphaceloma violae) has been reported from New York, New Jersey, Pennsylvania, South Carolina, Georgia, and Florida.

VIOLA TRICOLOR. PANSY. Leaf spot (Alternaria sp.) and anthracnose (Colletotrichum violae-tricoloris) were reported from New Jersey.

WEIGELA SPP. WEIGELA. Root rot (Phymatotrichum omnivorum) on W. rosea, Texas. Leaf spot (Ramularia diervillae) in one nursery in Tennessee, 75 per cent infection occurred on leaves of the variety Henderson.

WISTERIA SPP. WISTERIA. Leaf spot (Phyllosticta sp.), New Jersey. Tuberularia vulgaris, Connecticut.

YUCCA SPP. YUCCA. Leaf spot (Cercospora concentrica), Texas. Leaf spot (Coniothyrium concentricum), New Jersey on Y. filamentosa, Washington. Leaf spot (Epicoccum asterinum), Texas on Y. filamentosa. Leaf spot (Kellermannia yuccaelegans) on special permit material grown in California (Bureau Plant Quarantine News Letter, No. 30, p. 5, June 1933). Leaf blight (Neottiospora yuccaefolia), Washington.

ZANTEDESCHIA AETHIOPICA. COMMON CALLA. Crown rot (Bacillus aroideae) was reported from New York where it is becoming less troublesome due to the more general practice of corm disinfection before planting,

and from New Jersey. A disease reported as mosaic, possibly due to a virus, occurred in Washington. Another virus disease, spotted wilt, was reported from Indiana by R. W. Sampson, as follows: "Three diseased plants were collected in a greenhouse at Hobart. Inoculations made to tomato, jimson weed, and tobacco, resulted in symptoms very similar to those described for spotted wilt by Samuel in Australia."

ZINNIA ELEGANS. COMMON ZINNIA. Leaf blight (Alternaria sp.), New Jersey. Leaf spot (Cercospora atricincta), Texas. Powdery mildew (Erysiphe cichoracearum), Connecticut, New Jersey, Texas, Minnesota, North Dakota, and Kansas. Root rot (Rhizoctonia sp.) and charcoal stem rot (Rhizoctonia bataticola), Texas. Mosaic (virus), Kansas.

DISEASES OF MISCELLANEOUS PLANTS

DYING OR WASTING DISEASE OF EEL-GRASS. The disappearance of the eel-grass, Zostera marina, along the Atlantic Coast of both North America and Europe, constitutes a problem of exceptional interest, whether it is finally found to be due to the effects of some change in environment or to the attack of a parasite, or to both acting together. In itself the plant is important to only a limited extent, but indirectly it is of very great importance. It is a source of food for sea-fowl, especially the brant. Its thick growth offers hiding-places for young fish, and also protects the shoreline from washing in many places. Clarence Cottam of the U. S. Biological Survey has discussed the disease fully in the Plant Disease Reporter, Vol. 17, pp. 46-53, 119-120, 142-143.

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Rosa spp., 90.
Rosmarinus officinalis, 90.
Schinus molle, 69.
Spiraea spp., 90.
Syringa spp., 90.
Tilia americana, 69.
weeping willow, 69.
Weigela rosea, 91.
Physalospora obtusa, apple, 32.
 pear, 34.
 quince, 34.
rhodina, see *Diplodia natalensis*.
Physoderma zeae-maydis, corn, 24.
Physopella fici, fig, 45.
Phytophthora sp., *Cordyline terminalis*, 31.
Pieris floribunda, 88.
cactorum, *Lilium* spp., 86.
Paeonia spp., 88.
Rhododendron spp., 89.
 strawberry, 39.
Syringa spp., 90.
Tulipa spp., 91.
capsici, pepper, 60.
cinnamomi, *Rhododendron penticum*, 89.

- Phytophthora citrophthora*, citrus, 43.
cryptogea, *Rhododendron* spp., 89.
hibernalis, citrus, 43.
infestans, potato, 46.
 tomato, 48.
parasitica, *Buxus sempervirens*,
 80.
Buxus suffruticosa, 80.
 citrus, 43.
 tobacco, 61.
phaseoli, lima bean, 51.
Piricularia grisea, rice, 25.
Plasmodiophora brassicae, cabbage, 52.
 cauliflower, 52.
Plasmopara viticola, grape, 38.
Pleosphaerulina briosiana, alfalfa, 27.
Pleurotus pulmonarius juglandis,
 Persian walnut,
 45.
 sapidus, American elm, 70.
ulmarius, apple, 33.
Plowrightia morbosa, cherry, 38.
 plum, 37.
 prune, 37.
Podosphaera leucotricha, apple, 32.
oxyacanthae, peach, 36.
Spiraea spp., 90.
Polyporus balsameus, *Abies balsamea*,
 75.
schweinitzii, *Larix laricina*, 75.
Picea mariana, 75.
Pinus banksiana, 76.
Pinus resinosa, 76.
Pinus strobus, 76.
Poria subacida, *Abies balsamea*, 75.
Potash hunger, cotton, 63.
 tobacco, 62.
Powdery mildew, *Phlox* spp., 88.
Pseudoperonospora cubensis,
 cantaloupe, 54.
 cucumber, 53.
humuli, hop, 63.
Pseudopeziza medicaginis, alfalfa,
 26.
ribis, currant, 42.
 gooseberry, 42.
trifolii, clover, 28.
Psorosis, citrus, 44.
Puccinia andropogi, *Andropogon*
scoparius, 30.
Fuccinia anomala, barley, 21.
antirrhini, *Antirrhinum majus*, 79.
arachidis, peanut, 63.
asparagi, asparagus, 58.
caricis, currant, 42.
 gooseberry, 42.
conoclinii, *Ageratum*, 78.
coronata, *Lolium perenne*, 30.
 oats, 23.
cyani, *Centaurea cyanus*, 81.
dispersa, rye, 20.
glumarum, wheat, 10.
graminis agrostidis, *Agrostis*
 alba, 30.
avenae, oats, 23.
secalis, rye, 20.
tritici, barley, 21.
 wheat, 18.
helianthi, sunflower, 30.
heterospora, *Althaea rosea*, 78.
iridis, *Iris* spp., 85.
Iris hexagona, 85.
Iris histrio, 35.
Iris histrioides, 85.
Iris leichtlini, 85.
Iris mariae, 35.
Iris sindjarensis, 35.
malvacearum, *Althaea rosea*, 78.
menthae, *Monarda didyma*, 87
Monarda didyma splendens, 87.
Monarda kalmiana, 87.
Monarda ramaleyi, 87.
purpurea, *Holcus halepensis*, 30.
schedonnardi, cotton, 63.
sorghii, corn, 24.
triticina, wheat, 18.
violae, *Viola* sp., 91.
Viola odorata, 91.
Pucciniastrum spp., *Azalea* spp., 79.
americanum, raspberry, 41.
goeppertianum, blueberry, 42.
myrtilli, *Azalea viscosa*, 79.
Rhododendron lutescens, 89.
Rhododendron ponticum, 89.
Tsuga canadensis, 76.
Pyrenopeziza medicaginis, alfalfa, 27.
Pythium, pea, 57.
 tobacco, 62.
 sp., beet, 59.
Gladiolus, 84.

Pythium spp., sugar beet, 65.
 arrhenomanes, sugar cane, 64.
 debaryanum, pea, 58.
 spinach, 60.
 Pythium-like fungus, sweet clover, 28.

R

Ramularia sp., Lathyrus odoratus, 85.
 diervillae, Weigela spp., 91.
 Razoumofskya pusilla, Picea mariana,
 75.
 Red blotch, lemon, 44.
 Red leaf spot, Rhododendron medi-
 caulis, 89.
 Rhizoctonia, Delphinium spp., 82.
 pea, 57.
 tobacco, 62.
 sp., Chrysanthemum sp., 81.
 Cosmos bipinnatus, 82.
 cowpea, 29.
 Dianthus barbatus, 83.
 Lathyrus odoratus, 85.
 Zinnia elegans, 92.
 bataticola, sweet potato, 50.
 Zinnia elegans, 92.
 crocorum, potato, 47.
 sweet potato, 50.
 solani, Begonia spp., 79.
 Calendula officinalis, 80.
 Callistephus chinensis, 80.
 Chrysanthemum hortorum, 81.
 Digitalis purpurea, 83.
 Eupatorium sp., 83.
 Lilium candidum, 86.
 Matthiola incana, 87.
 pepper, 59.
 Trachymene caerulea, 91.
 tuliparum, Tulipa spp., 91.
 Rhizopus nigricans, strawberry, 39.
 sweet potato, 50.
 Rhynchosporium secalis, barley, 22.
 Rhytisma acerinum, Acer spp., 66.
 Acer dasycarpum, 66.
 Acer rubrum, 66.
 liriodendri, Liriodendron
 tulipifera, 68.
 punctatum, Acer spp., 66.
 Acer spicatum, 66.

Ring spot, Aspidistra lurida, 79.
 Lupinus spp., 86.
 tobacco, 61.
 Root rot, Begonia spp., 79.
 corn, 24.
 Lathyrus odoratus, 85.
 sweet clover, 28.
 Rosette, pecan, 46.

S

Sacodium ulmi-gallae, Chinese elm, 70.
 Schizophyllum commune, Castanea
 dentata, 67.
 Persian walnut, 45.
 Sclerotinia sp., Amygdalus sp., 78.
 spp., lettuce, 56.
 cinerea pruni, cherry, 38; pear, 34.
 plum, 37.
 prune, 37.
 fructicola, cherry, 37.
 peach, 35.
 plum, 37.
 prune, 37.
 gladioli, Gladiolus, 84.
 minor, lettuce, 56.
 sclerotiorum, Aquilegia spp., 79.
 Calceolaria sp., 80.
 Calendula officinalis, 80.
 celery, 56.
 Coreopsis sp., 82.
 Coreopsis tinctoria, 82.
 Delphinium spp., 82.
 lemon, 44.
 lettuce, 56.
 pea, 57.
 potato, 47.
 squash, 55.
 trifoliorum, alfalfa, 26.
 clover, 28.
 Sclerotium sp., Delphinium spp., 77, 32.
 bifrons, quaking aspen, 68.
 delphinii, Aconitum sp., 77.
 Accrithum napellus, 77.
 Ajuga reptans, 77.
 Anemone chinensis, 77.
 Aquilegia sp., 77.
 Campanula medium, 77.

- Sclerotium delphinii*, *Dahlia variabilis*, 77.
Eupatorium sp., 77.
Iris spp., 77.
Iris cristata, 77.
Iris sibirica, 77.
Lobelia sp., 77.
Pentstemon sp., 77.
Pentstemon barbatus, 77.
Phlox spp., 77.
Rudbeckia, 77.
Stevia sp., 77.
Tulipa spp., 77.
Veronica filiformis, 77.
Veronica repens, 77.
gladioli, see *Sclerotinia gladioli*.
oryzae, rice, see *Leptosphaeria salvinii*, 25.
rolfsii, alfalfa, 26.
 Antirrhinum majus, 77.
 banana, 45.
 Calendula sp., 77.
 Delphinium spp., 77.
 Iris spp., 77.
 Lespedeza stipulacea, 29.
 Lilium spp., 77.
 pepper, 59.
 potato, 47.
 soybean, 29.
 strawberry, 39.
 sugar beet, 65.
Scolecotrichum graminis, *Phleum pratense*, 31.
Scorch, pea, 58.
Septoria sp., *Agrostis maritimus*, 31.
 Bromus commutatus, 31.
 Bromus hordeaceus, 31.
 Bromus marginatus, 31.
 Castanea spp., 67.
 Kerria japonica, 85.
 Notholcus lanatus, 31.
 Poa compressa, 31.
 Poa pratensis, 31.
 Poa sandbergii, 31.
 Populus spp., 68.
 Rosa spp., 90.
 Sitanion hystrrix, 31.
 spp., celery, 55.
 acicola, *Pinus murrayana*, 76.
 Pinus nigra poiretiana, 76.
 Pinus sylvestris, 76.
- Septoria azaleae*, *Azalea* spp., 79.
 Azalea hinodegiri, 79.
 Azalea indica, 79.
 callistephi, *Callistephus chinensis*, 80.
 chrysanthemella, *Chrysanthemum hortorum*, 81.
 citri, grapefruit, 44.
 lemon, 44.
 gladioli, *Gladiolus*, 84.
 glycines, soybean, 29.
 hyalina, *Viola primulifolia*, 91.
 kalmicola, *Kalmia* spp., 85.
 lactucae, lettuce, 57.
 leucostoma, *Fraxinus texensis*, 67.
 lycopersici, tomato, 48.
 musina, *Populus deltoides*, 68.
 nodorum, wheat, 19.
 phlogis, *Phlox divaricata*, 88.
 pisii, pea, 58.
 polemonii, *Polemonium reptans*, 88.
 trifolii, clover, 28.
 tritici, wheat, 19.
Sorosporium reilianum, sorghum, 25.
Sphaceloma ampelinum, see *Elsinoe ampelina*.
 fawcettii, grapefruit, 43.
 King orange, 43.
 lemon, 43.
 lime, 43.
 perseae, avocado, 44.
 rosarum, *Rosa* spp., 90.
 symphoricarpi, *Symphoricarpos albus laevigatus*, 90.
 viclae, *Viola* spp., 91.
Sphacelotheca spp., sorghum, 25.
Sphaeropsis sp., *Cornus florida*, 82.
 Fraxinus americana, 67.
 Ilex opaca, 67.
 Populus spp., 68.
 Rhododendron maximum, 89.
 Ulmus spp., 70.
 ellissii, *Pinus* spp., 76.
 malorum, see *Physalospora obtusa*.
 Cotoneaster spp., 82.
 peach, 36.
 Pinus nigra, 76.
 Quercus spp., 69.
 Ulmus pumila, 70.
 salicis, *Salix* spp., 69.

Sphaerotheca humuli, raspberry, 41.
Rosa spp., 89.

strawberry, 39.

mors-uvae, gooseberry, 42.

pannosa, *Rosa* spp., 90.

Spindle tuber, potato; 48.

Spondylocladium atrovirens, potato, 47.

Spongospora subterranea, potato, 47.

Sporocybe azaleae, *Azalea* spp., 79.

Spot necrosis, rhubarb, 60.

Spotted wilt, *Zantedeschia aethiopica*, 92.

Spray injury, apple, 33.

peach, 36.

Spring dying, sweet clover, 28.

Stagonospora curtisii, *Narcissus* spp., 87.

Nerine spp., 87.

Nerine flexuosa alba, 87.

Nerine plantii, 87.

Stalk rots, corn, 24.

Stilbum cinnabarinum, fig, 45.

storage rots, sweet potato, 50.

Straighthead, rice, 25.

Streak, pea, 58.

raspberry, 41.

tomato, 49.

Stunt, *Dahlia* spp., 82.

Delphinium spp., 82.

Stylar-end rot, lime, 44.

T

Taphrina johansonii, largetooth aspen, 68.

quaking aspen, 68.

Thelephora laciniata, conifer seedlings, 76.

Thielavia basicola, *Lathyrus odoratus*, 85.

tobacco, 61.

Tilletia horrida, rice, 25.

lévis, wheat, 17.

tritici, wheat, 17.

Tipburn, lettuce, 57.

potato, 48.

Trametes pini, *Picea canadensis*, 75.

Picea mariana, 75.

Pinus banksiana, 76.

Pinus resinosa, 76.

Pinus strobus, 76.

Tranzschelia pruni-spinosae, peach, 36.
punctata, see *Tranzschelia pruni-spinosae*.

Tuberularia fici, fig, 45.

vulgaris, *Acer palmatum*, 66.

Wisteria spp., 91.

Tylenchus, see *Anguillulina*.

U

Uncinula necator, grape, 38.

salicis, quaking aspen, 69.

Urocystis cepulae, onion, 52.

occulta, rye, 20.

tritici, wheat, 17.

Uromyces spp., clover, 28.

appendiculatus, see *Uromyces phaseli*.

caryophyllinus, *Dianthus caryophyllus*, 83.

eragrostidis, *Eragrostis capillaris*, 30

halstedii, *Homalocenchrus virginicus*, 30.

hordeinus, *Hordeum pusillum*, 30.

lespedezae-procumbentis, *Lespedeza* pedeza, 29.

medicaginis, alfalfa, 27.

phaseoli, bean, 51.

proeminens, *Poinsettia* spp., 88.

spermacoces, *Diodia teres*, 30.

striatus, *Medicago lupulina*, 29.

Ustilago avenae, oats, 23.

bromivora, *Agropyron* sp., 30.

cynodontis, *Capriola cactylon*, 30.

hordei, barley, 21.

hypodytes, *Quincy grass*, 30.

*levi*s, oats, 23.

nuda, barley, 21.

rabenhorstiana, *Syntherisma*

sanguinalis, 30.

striaeformis, *Lolium perenne*, 30.

tritici, wheat, 17.

violacea, *Dianthus* sp., 83.

zeae, corn, 24.

V

Valsa leucostoma, peach, 36.

Venturia sp., *Pyracantha coccinea*, 88.
inaequalis, apple, 31.

Venturia pyrina, pear, 34.
 tremulae, see *Fusicladium radi-*
 osum, 68.
 Verticillium sp., *Acer* spp., 66.
 Matthiola spp., 87.
 pea, 58.
 raspberry, 41
 alboatrum, *Acer* spp., 66.
 Acer platanoides, 66.
 Acer saccharum, 66.
 American elm, 70.
 Antirrhinum majus, 79.
 cotton, 63.
 eggplant, 59.
 potato, 47.
 buxi, *Buxus sempervirens*, 80.
 Buxus suffruticosa, 80.
 dahliae, *Acer palmatum*, 66.
 Acer platanoides, 66.
 American elm, 70.
 Antirrhinum majus, 79.
 Berberis thunbergii, 80.
 Chrysanthemum hortorum, 81.
 Dahlia spp., 82.
 Liatris sp., 86.
 Rhus cotinus, 89.
 Vibrissea hypogaea, grape, 39.
 Volutella sp., *Pachysandra terminalis*,
 88.
 buxi, see *Nectria rousseliana*.
 Buxus sempervirens, 80.
 Buxus suffruticosa, 80.

Y

 Yellow dwarf, potato, 48.
 Yellow flat, *Lilium candidum*, 86.
 Lilium longiflorum, 86.
 Yellows, alfalfa, 27.
 Calendula officinalis, 80.
 Callistephus chinensis, 81.
 celery, 55, 56.
 Chrysanthemum hortorum, 81.
 Helichrysum spp., 34.
 lettuce, 57.
 peach, 36.
 rutabaga, 53.
 strawberry, 40.
 turnip, 53.

W

Wasting disease, *Zostera marina*, see
 Dying, eel-grass.
 Water spot and rot, orange, 44.
 Winter injury, peach, 36.
 Pinus nigra, 76.
 raspberry, 41.
 Syringa spp., 90.
 Witches' broom, alfalfa, 27.
 Delphinium spp., 82.

X

Xylaria sp., apple, 33.
 cherry, 38.

